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Commonwealth of
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## Commonwealth of Pennsylvania.

## DEPARTMENT OF AGRICULTURE

**BULLETIN No. 239**

LIST OF

# County and Local Agricultural Societies

WITH NAMES AND ADDRESSES OF PRESIDENTS AND SECRETARIES
AND DATES FOR HOLDING FALL EXHIBITIONS OF 1913

COMPILED FROM OFFICIAL REPORTS AND SOURCES
BY

A. L. MARTIN
*Deputy Secretary of Agriculture*

**JUNE 1, 1913—CORRECTED TO DATE**

HARRISBURG:
O. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1913.

Commonwealth of Pennsylvania.

DEPARTMENT OF AGRICULTURE

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# PREFACE

Harrisburg, Pa., May 1, 1913.

In order to promote correspondence and co-operation so far as may be possible among the agricultural societies and fair associations of the State, this Department again gives, in the following Bulletin, No. 239, as full a list as it has been able to secure of such societies and associations within the Commonwealth, together with the names and addresses of their officers, and the dates arranged for exhibitions during the coming Fall.

It will be noticed that some of the societies given in the list do not hold exhibitions. They, however, appear in the bulletin in order that the list of associations organized for the advancement of agricultural education may be as complete as possible, and to give other associations opportunity to correspond with them. The societies, whether holding fairs or not, are fruitful sources of good to the agriculture of the Commonwealth, and are assured of the sympathy and, as far as possible, the co-operation of this Department.

N. B. CRITCHFIELD,
Secretary of Agriculture.

# LETTER OF TRANSMITTAL

Harrisburg, Pa., May 1, 1913.

Hon. N. B. Critchfield, Secretary of Agriculture:

Dear Sir: This bulletin contains list of Local and County Agricultural and Horticultural Societies, dates of Fairs and Grange Exhibits to be held in Pennsylvania during the year 1913, as reported by Secretaries representing the different organizations.

The attendance for 1912 was 1,568,500, as compared with previous year, 1,522,500, shows an increase of 46,000. Total membership, 15,345; amount received from State Fund, $33,563.22; amount paid in premiums, 1912, $134,377.74; as compared with pervious year, $108,377.50, shows an increase of $26,000.24; amount offered in premiums, 1913, $155,250.00.

Very respectfully,

A. L. MARTIN,

Deputy Secretary.

# List of County and Local Agricultural Societies, with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions for 1913, Etc.

| County | Corporate Name of Society | Name and Address of President | Name and Address of Secretary |
|---|---|---|---|
| | State Horticultural Association of Pennsylvania | W. T. Creasy, Catawissa | Chester J. Tyson, Floradale. |
| Adams | Fruit Growers Association of Adams County | Robert M. Eldon, Aspers | Edwin C. Tyson, Floradale. |
| Allegheny | Allegheny County Agricultural Association | J. M. Patterson, Imperial | H. W. DeLong, Imperial . |
| Armstrong | Dayton Agricultural and Mechanical Association | A. K. Good, Dayton | C. C. Cochran, Dayton. |
| Armstrong | Kiskiminetas Valley Agricultural and Driving Association | L. Todd Owens, Apollo | Dean Clark, Vandergrift. |
| Bedford | Bedford County Agricultural Society | Dr. S. F. Statler, Bedford | J. Roy Cessna, Bedford. |
| Bedford | Osterburg Grange Picnic Association | S. S. Kauffman, Osterburg | Geo. W. Oster, Osterburg. |
| Berks | Kutztown Fair Association | Chas. D. Herman, Kutztown | G. C. Bordner, Kutztown. |
| Berks | Agricultural and Horticultural Association of Berks County | James P. Hennessy, Reading | D. J. McDermott, Reading. |
| Blair | Blair County Grange Fair Association | Dr. W. Frank Beck, Altoona | H. S. Wertz, Duncansville |
| Bradford | Bradford County Agricultural Society | Benj. Kuykendall, Towanda | G. G. Johnston, Towanda. |
| Bradford | Troy Agricultural Society | J. W. Pomeroy, Troy | W. S. Montgomery, Troy. |
| Bradford | Wyalusing Fair Association | S. M. Wells, Wyalusing | G. M. Lyon, Wyalusing. |
| Bucks | Bucks County Agricultural Society | F. W. DeLancey, Sellersville | I. Y. Baringer, Perkasie. |
| Bucks | Farmers' Picnic and Exhibition | Harry S. Johnson, Quakertown | Elmer D. Hering, Quakertown. |
| Butler | Butler Driving Park and Fair Association | Geo. A. Schaffner, Butler | W. B. Purvis, Butler. |
| Cambria | Cambria County Agricultural Association | G. E. Hipps, Carrolltown | J. V. Mancher, M. D., Carrolltown. |
| Cameron | Cameron County Agricultural Association | F. X. Blumle, Emporium | F. G. Judd, Emporium |
| Carbon | Carbon County Industrial Society | O. Frank Acker, Lehighton | J. Albert Durling, Lehighton. |
| Center | Patrons of Husbandry Encampment and Fair Association | Leonard Rhone, Centre Hall | Leonard Rhone, Centre Hall. |
| Chester | Oxford Agricultural Association | T. F. Grier, Oxford | H. C. Thomas, Oxford. |
| Chester | Chester County Agricultural Association | John H. Darlington, West Chester | Frederic DeRose Reid, West Chester. |
| Clarion | Clarion County Fair Association | B. W. Thompson, Clarion | B. H. Frampton, Clarion. |
| Clearfield | Clearfield County Agricultural Society | Harry E. Owens, Clearfield | G. O. Goss, Curwensville. |
| Clearfield | DuBois Driving Association | J. A. Slaugenhoupt, DuBois | P. E. Griesemer, DuBois. |
| Columbia | Columbia County Agricultural, Horticultural, Mechanical Association | E. D. Hagenbuch, Bloomsburg | A. N. Yost, Bloomsburg. |
| Crawford | Conneaut Lake Agricultural Association | H. O. Holcomb, Conneant Lake | Chas. T. Byers, Conneaut Lake. |
| Crawford | Oil Creek Agricultural Fair Association | James B. Pastorius, Tutusville | Frank H. Flanders, Titusville. |
| Cumberland | Grangers Picnic Association | R. H. Thomas, Jr., Mechanicsburg | H. S. Mohler, Mechanicsburg. |
| Cumberland | Agricultural Society of Cumberland County | Abram Bosler, Carlisle | W. H. McCrea, Carlisle. |
| Cumberland | Hogestown Horse and Cattle Show | John C. Parker, Mechanicsburg | Frank Martin, West Fairview. |
| Dauphin | Middletown Fair Association | Edward S. Kelper, Middletown | John W. Metzger, Middletown. |
| Dauphin | Gratz Agricultural and Horticultural Association | Harry Smith, Gratz | F. S. Klinger, Gratz. |
| Erie, | Wattsburg Agricultural Society | U. S. Fuller, Wattsburg | J. J. Rouse, Wattsburg. |
| Erie, | Corry Fair and Driving Park Association | D. Warren De Rosay, Corry | Wake Morgaridge, Corry. |
| Greene | Greene County Agricultural and Manufacturing Society | W. M. Biddle, Carmichaels | Chas. J. Lincoln, Carmichaels. |
| Indiana | Indiana County Agricultural Society | M. F. Jamison, Indiana | David Blair, Indiana. |
| Jefferson | Jefferson County Agricultural Society and Driving Park Association | Sam Arthurs, Brookville | Arthur B. Stewart, Brookville. |

| | | | |
|---|---|---|---|
| Jefferson | Punxsutawney Agricultural Fair Association | Dr. G. W. Means, Punxsutawney | Dr. Frank A. Loranzo, Punxsutawney. |
| Juniata | Juniata County Agricultural Society | Robert E. Groninger, Port Royal | J. N. Groninger, Port Royal. |
| Lackawanna | Lackawanna County Fair and Grange Poultry Association | J. F. Lacoe, Ransom, R. F. D. | F. L. Thompson, Schultzville. |
| Lancaster | Lancaster County Agricultural Fair Association | P. T. Watt, Lancaster | J. F. Seldomridge, Lancaster. |
| Lawrence | Pulaski Fair Association | George Watson, West Middlesex | H. H. Knox, Pulaski. |
| Lebanon | Lebanon Valley Fair Association | W. H. Bollman, Lebanon | J. A. Bollman, Lebanon. |
| Lebanon | Lebanon County Agricultural and Horticultural Association | Edgar A. Weimer, Lebanon | S. P. Heilman, M. D., Lebanon. |
| Lehigh | Lehigh County Agricultural Society | John W. Eckert, Allentown | Harry S. Schall, Allentown. |
| Lycoming | Muncy Valley Farmers Club | Thos. A. Boak, Hughesville | Edward E. Frantz, Hughesville. |
| McKean | McKean County Fair Association | R. W. Hilton, Smethport | H. J. Rice, Smethport. |
| Mercer | Mercer County Agricultural Society | Vete Porter, Sandy Lake | Geo. H. Fowler, Stoneboro. |
| Mercer | Mercer Central Agricultural Association | A. J. McKean, Mercer | J. P. Orr, Mercer. |
| Monroe | Monroe County Agricultural Society | W. C. Wood, Stroudsburg | W. M. Burnett, Stroudsburg. |
| Northampton | Northampton County Agricultural Society | Stephen Schlegel, Nazareth, R. D. No. 1. | J. R. Reinheimer, Nazareth. |
| Northumberland | Milton Fair and Northumberland County Agricultural Association | John J. Kelly, Milton | J. J. Johnson, Milton. |
| Perry | Perry County Agricultural Society | T. H. Butturf, Newport | J. C. F. Stephens, Newport. |
| Philadelphia | Pennsylvania Horticultural Society | C. B. Newbold, Philadelphia | David Rust, Horticultural Hall, Philadelphia. |
| Sullivan | Sullivan County Agricultural Society | A. A. Collins, Forksville | O. N. Molyneux, Dushore. |
| Susquehanna | Susquehanna County Agricultural Society | F. A. Davies, Montrose | W. G. Comstock, Montrose. |
| Susquehanna | Harford Agricultural Society | F. A. Osborne, Harford | O. F. Maynard, Harford. |
| Susquehanna | Lawton Agricultural Society | Isaiah Haire, Lawton | S. C. Birchard, Lawton. |
| Tioga | Cowanesque Valley Agricultural Society | George Rumsey, Westfield | J. W. Smith, Westfield. |
| Tioga | Smythe Park Association | J. F. Pitts, Wellsboro | R. C. Longbothum, Mansfield. |
| Tioga | Tioga County Pomona Grange | George Coveney, Mansfield | W. H. Whiting, Wellsboro. |
| Union | Union County Agricultural Society | Wm. P. Mauser, Lewisburg, R. D. | C. Dale Wolke, Lewisburg. |
| Washington | Union Agricultural Association | H. S. Buchanan, Hickory, R. D. No. 1. | D. S. Taylor, Burgettstown, R. D. No. 3. |
| Washington | Sandy Plains Fair Association | Andrew Allen, Millsboro | B. Frank Emery, Millsboro. |
| Warren | Warren County Farmers' and Breeders' Association, | C. R. Hedges, Akeley | R. J. Weld, Sugargrove. |
| Wayne | Wayne County Agricultural Society | W. L. Ferguson, Seelyville | E. W. Gammell, Honesdale. |
| Westmoreland | Westmoreland Agricultural Society | John W. Ruth, Scottdale | W. F. Holtzer, Greensburg. |
| Wyoming | Wyoming County Fair Association | J. W. Stark, Tunkhannock | O. D. Stark, Tunkhannock. |
| York | York County Agricultural Society | John H. Wogan, York | Henry C. Heckert, York. |
| York | Hanover Agricultural Society | C. J. Delone, Hanover | J. B. Miller, Hanover. |
| York | New Freedom Farmers Improvement Association | G. L. Hortenstein, New Freedom | M. F. Zeigler, New Freedom. |
| York | Pen Mar County Agricultural Association | Milton E. Smith, New Park | H. M. Anderson, New Park. |

## List of County and Local Agricultural Societies, with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions of 1913, Etc.—Continued.

| County | Corporate Name of Society | Attendance, 1912 | Race track | Membership | Amount received from State fund | Premiums | | Held 1913 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Paid, 1912 | Offered, 1913 | Place | Date |
| | State Horticultural Asso. of Penna. | | | 750 | | $500 00 | $700 00 | | No fair |
| Adams | Fruit Growers Asso. of Adams County | | | 239 | | | | Bendersville | Dec. 17-19 |
| Allegheny | Allegheny County Agricultural Association | | ½ mile | | | | | Imperial | Not decided |
| Armstrong | Dayton Agricultural and Mechanical Asso. | 20000 | ½ mile | 280 | $411 10 | 1242 50 | 2500 00 | Dayton | Sept. 23-26 |
| Armstrong | Kiskiminetas Valley Agricultural and Driving Association | 20000 | ½ Mile | 182 | 588 00 | 4950 76 | | Apollo | Sept. 3-6 |
| Bedford | Bedford County Agricultural Society | 6500 | ½ mile | 600 | 1000 00 | 975 35 | | Bedford | Sept. 23-26 |
| Bedford | Osterburg Grange Picnic Association | | ½ mile | | | | | Osterburg | Not decided |
| Berks | Kutztown Fair Association | 60000 | ½ mile | 586 | 832 96 | 2500 00 | 3500 00 | Kutztown | Aug. 26-29 |
| Berks | Berks County Agrl. and Hort. Asso. | 40000 | ½ mile | 500 | 541 15 | 915 00 | 2500 00 | Reading | Sept. 9-12 |
| Blair | Blair County Grange Fair Association | 40000 | ½ mile | 15 | 100 00 | 1100 00 | 2000 00 | Hollidaysburg | Sept. 16-19 |
| Bradford | Bradford County Agricultural Society | 13000 | ½ mile | 200 | 450 00 | 1600 00 | 2000 00 | Towanda | Sept. 9-12 |
| Bradford | Troy Agricultural Society | 15000 | ½ mile | 3 | 199 98 | 1500 00 | 2000 00 | Troy | Sept. 2-5 |
| Bradford | Wyalusing Fair Association | 5000 | ½ mile | | | | | Wyalusing | Aug. 27-29 |
| Bucks | Bucks County Agricultural Society | 7000 | | | 695 14 | 695 14 | 1000 00 | Perkasie | Sept. 17-20 |
| Bucks | Farmers' Picnic and Exhibition | 15000 | | 50 | | 150 00 | 150 00 | Quakertown | Aug. 29-Sept. 1 |
| Butler | Butler Driving Park and Fair Asso. | 40000 | ½ mile | 350 | | 3926 45 | 4000 00 | Butler | Aug. 26-29 |
| Cambria | Cambria County Agricultural Asso. | 7000 | ½ mile | 379 | 405 20 | 440 75 | | Carrolltown | Sept. 2-5 |
| Cameron | Cameron County Agricultural Asso. | 10000 | ½ mile | 10 | 1000 00 | 392 50 | 1000 00 | Emporium | Sept. 9-12 |
| Carbon | Carbon County Industrial Society | 25000 | ½ mile | 40 | 958 78 | 958 78 | 1000 00 | Lehighton | Sept. 30-Oct. 3 |
| Centre | Patrons of Husbandry Encampment and Fair Association | 15000 | | 1500 | 140 00 | 150 00 | 200 00 | Centre Hall | Sept. 13-19 |
| Chester | Oxford Agricultural Association | 9000 | ½ mile | | 350 00 | 1000 00 | 1500 00 | Oxford | Sept. 24-26 |
| Chester | Chester County Agricultural Association | 18000 | ½ mile | 179 | 650 36 | 2357 50 | 2500 00 | West Chester | Sept. 16-19 |
| Clarion | Clarion County Fair Association | 13000 | ½ mile | 240 | 1000 00 | 1080 00 | 1050 00 | Clarion | Sept. 23-26 |
| Clearfield | Clearfield County Agricultural Asso. | | | 200 | 50 00 | 35 00 | 50 00 | Clearfield | January |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Columbia | Columbia County Agril. Hort. and Mch. Asso. | 33000 | ½ mile | 400 | 1000 00 | 7679 70 | 8000 00 | Bloomsburg | Oct. 7-10. |
| Clearfield | DuBois Driving Association | 12500 | ½ mile | 130 | 678 54 | 1246 00 | 1500 00 | DuBois | Sept. 9-12 |
| Crawford | Conneaut Lake Agricultural Association | 41000 | ½ mile | | 680 08 | 5500 00 | 6000 00 | Exposition Park | Aug. 26-30 |
| Crawford | Oil Creek Agricultural Society | 30000 | ½ mile | 350 | 319 87 | 1429 05 | 2000 00 | Titusville | Sept. 8-12 |
| Cumberland | Grangers Picnic Association | 60000 | | | | | | Williams Grove | Aug. 25-30 |
| Cumberland | Agricultural Society of Cumberland County | 20000 | ½ mile | 62 | 1000 00 | 1500 00 | 2000 00 | Carlisle | Sept. 23-26 |
| Cumberland | Hogestown Horse and Cattle Show | 4000 | | | | | | Hogestown | June 4-5 |
| Dauphin | Middletown Fair Association | 30000 | ½ mile | 9 | 428 20 | 397 25 | 1000 00 | Middletown | Sept. 2-5 |
| Dauphin | Gratz Agrl. and Hort. Association | 10000 | ½ mile | 20 | 571 80 | 680 90 | 1000 00 | Gratz | Sept. 16-19 |
| Erie | Wattsburg Agricultural Society | 4000 | ½ mile | | 382 00 | 450 00 | 550 00 | Wattsburg | Sept. 16-19 |
| Erie | Corry Fair and Driving Park Asso. | 20000 | ½ mile | 8 | 617 91 | 1119 10 | 1500 00 | Corry | Sept. 2-5 |
| Greene | Greene County Agr. and Mfg. Society | 10000 | ½ mile | 125 | 424 96 | 4000 00 | 4000 00 | Carmichaels | Sept. 23-26 |
| Indiana | Indiana County Agricultural Society | 40000 | ½ mile | | 1000 00 | 3500 00 | 4000 00 | Indiana | Sept. 9-12 |
| Jefferson | Jefferson County Agricultural Society and Driving Park Association | 13000 | ½ mile | | 734 05 | | | Brookville | Not decided |
| Jefferson | Punxsutawney Agricultural Fair Asso. | 40000 | ½ mile | 100 | | 1500 00 | 1500 00 | Punxsutawney | Sept. 16-19 |
| Juniata | Juniata County Agricultural Society | 25000 | ½ mile | 113 | 1000 00 | 1000 00 | 1000 00 | Port Royal | Sept. 9-12 |
| Lackawanna | Lackawanna County Fair and Grange Poultry Association | 7000 | ¼ mile | 68 | 745 95 | 775 00 | 1000 00 | Clarks Summit | Not decided |
| Lancaster | Lancaster County Agricultural Fair Asso. | 65000 | ½ mile | 336 | 1000 00 | 5194 25 | 6000 00 | Lancaster | Sept. 30-Oct. 3 |
| Lawrence | Pulaski Fair Association | | ½ mile | | | | | Pulaski | Not decided |
| Lebanon | Lebanon Valley Fair Association | 55000 | ½ mile | 800 | 1000.00 | 5222 50 | 6000 00 | Lebanon | Aug. 19-22 |
| Lebanon | Lebanon County Agrl. and Hort. Asso. | | | 150 | 67 45 | | | Lebanon | Not decided |
| Lehigh | Lehigh County Agricultural Society | 100000 | ½ mile | 897 | 1000 00 | 26000 00 | 26000 00 | Allentown | Sept. 23-26 |
| Lycoming | Muncy Valley Farmers' Club, | 15000 | ½ mile | 139 | 1000 00 | 1064 90 | 1000 00 | Hughesville | Oct. 14-17 |
| McKean | McKean County Fair Association | 5000 | ½ mile | 125 | 1000 00 | 1077 20 | 5000 00 | Smethport | Sept. 16-19 |
| Mercer | Mercer County Agricultural Society | 25000 | ½ mile | 300 | 500 00 | 2400 00 | 3500 00 | Stoneboro | Sept. 15-18 |
| Mercer | Mercer Central Agricultural Association | | ½ mile | | | | | Mercer | Not decided |
| Monroe | Monroe County Agricultural Society | 15000 | ½ mile | 15 | 100 00 | 924 20 | 1000 00 | Stroudsburg | Sept. 1-5 |
| Northampton | Northampton County Agricultural Asso. | 50000 | ½ mile | 325 | 1000 00 | 1823 45 | 8500 00 | Nazareth | Sept. 16-19 |
| Northumberland | Milton Fair and Northumberland County Agricultural Association | 40000 | ½ mile | 156 | 984 00 | 5000 00 | 5000 00 | Milton | Sept. 30-Oct 3 |
| Perry | Perry County Agricultural Society | 12000 | ½ mile | 400 | 1000 00 | 1098 75 | 1500 00 | Newport | Oct. 14-17 |
| Philadelphia | Philadelphia Horticultural Society | | | 920 | | 4600 00 | 4750 00 | Horticul. Hall, Philadelphia | Nov. 4-7 |
| Sullivan | Sullivan County Agricultural Society | 3000 | | 65 | 466 45 | 475 25 | 900 00 | Forksville | Sept. 30-Oct 2 |
| Susquehanna | Susquehanna County Agricultural Society | 5000 | | 69 | 586 00 | 705 25 | 900 00 | Montrose | Sept. 2-4 |
| Susquehanna | Harford Agricultural Society | 4000 | | 125 | | 385 75 | 650 00 | Harford | Sept. 9-11 |
| Susquehanna | Lawton Agricultural Society | | | | | | | Lawton | Sept. 10-11 |
| Tioga | Cowanesque Valley Agricultural Society | 12000 | ½ mile | 50 | 407 84 | 1276 00 | 2000 00 | Westfield | Sept. 9-12 |
| Tioga | Smythe Park Association | 50000 | ½ mile | | 600 00 | 2059 76 | 8500 00 | Mansfield | Sept. 16-19 |
| Tioga | Tioga County Pomona Grange | 1000 | ½ mile | | | | | Wellsboro | September |
| Union | Union County Agricultural Society | 10000 | ½ mile | 202 | 1000 00 | 1141 75 | 1500 00 | Lewisburg | Sept. 23-26 |
| Washington | Union Agricultural Association | 27000 | ⅓ mile | 2000 | 332 25 | 3109 50 | 3500 00 | Burgettstown | Sept. 30-Oct. 2 |
| Washington | Sandy Plains Fair Association | | ½ mile | | | | | Millsboro | Not decided |
| Warren | Warren County Farmers' and Breeders' Association | | | 50 | | | | | |
| Wayne | Wayne County Agricultural Society | 10000 | ½ mile | 15 | 894 75 | 894 75 | 2500 00 | Honesdale | Not decided |

List of County and Local Agricultural Societies, with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions for 1913, Ets.—Continued.

| County | Corporate Name of Society | Attendance, 1912 | Race track | Membership | Amount received from State fund | Premiums |  | Held 1913 |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Paid, 1912 | Offered, 1913 | Place. | Date. |
| Westmoreland | Westmoreland Fair Association | 15000 | ½ mile | 16 | 590 00 | 2100 00 | 3000 00 | Youngwood | Sept. 9-12 |
| Wyoming | Wyoming County Fair Association | 12000 | ½ mile | 180 | 811 75 | 1800 00 | 2000 00 | Tunkhannock | Sept. 16-19 |
| York | York City Agricultural Society | 213000 | ½ mile | 228 | ---------- | 4800 00 | 5100 00 | York | Oct. 6-10 |
| York | Hanover Agricultural Society, | 25000 | ½ mile | ---------- | ---------- | $3000 00 | $3000 00 | Hanover | Sept. 16-19 |
| York | New Freedom Farmers' Improvement Association | 7000 | ---------- | 60 | $265 75 | 265 75 | 350 00 | New Freedom | Not decided |
| York | Pen-Mar County Agricultural Association | 14500 | ---------- | 40 | ---------- | 267 00 | 400 00 | Fawn Grove | Aug. 13-15 |
|  | Total | 1,568,500 | ---------- | 15,345 | $33,568 22 | $134,377 74 | $155,250 00 |  |  |

COMMONWEALTH OF PENNSYLVANIA

# DEPARTMENT OF AGRICULTU
## DAIRY AND FOOD DIVISION

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PRELIMINARY REPORT

OF THE

# Dairy and Food Commissio

FOR THE YEAR [illegible]

[illegible]

[illegible]

Commonwealth of Pennsylvania

# DEPARTMENT OF AGRICULTURE
## DAIRY AND FOOD DIVISION

**BULLETIN No. 240**

PRELIMINARY REPORT

OF THE

# DAIRY AND FOOD COMMISSIONER

FOR THE YEAR 1912

N. B. CRITCHFIELD, *Secretary of Agriculture*

JAMES FOUST, ***Dairy and Food Commissioner***

*Published by Direction of the Secretary*

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

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# LETTER OF TRANSMITTAL.

Harrisburg, Pa., *December 31, 1912.*

**Hon. N. B. Critchfield, Secretary of Agriculture:**

**Dear Sir:** I have the honor to submit herewith a preliminary report of the Dairy and Food Division of the Department of Agriculture for the year ending December 31, 1912. It covers the operations for the year and contains some details that may be useful for public information.

I have the honor to remain,

Very respectfully,

JAMES FOUST,
*Dairy and Food Commissioner.*

# PREFACE.

In view of the fact that the full Report of the Department of Agriculture for the year 1912, containing Reports of the several Divisions of the Department, will not be ready for distribution for some weeks, the Dairy and Food Commissioner has, in recent preceding years, furnished the Head of the Department with the following preliminary report. In order that this information may be promptly made available to the public, its issue as a bulletin of the Department is authorized.

The more detailed report of the operations of the Dairy and Food Bureau will appear in the regular Annual Department Report.

N. B. CRITCHFIELD,
*Secretary of Agriculture.*

# PRELIMINARY REPORT OF THE DAIRY AND FOOD COMMISSIONER

## INTRODUCTORY REMARKS.

The laws with whose enforcement this Division of the Department is charged are the same as for the year 1911, and are sufficiently described, so far as the legislation of that year is concerned, in my last annual report.

## JUDICIAL CONSTRUCTION OF THE FOOD LAWS.

Before laws can have their full force and effect, however, they commonly require judicial interpretation at various points or judicial confirmation of their constitutionality. During the past year, the courts have handed down several decisions of great importance to the enforcement of several of the food laws of this Commonwealth. These decisions merit individual conisderation.

## COLOR IN OLEOMARGARINE.

The oleomargarine act of May 29, 1901, prohibits the manufacture or sale of oleomargarine unless it "be made and kept free from all coloration or ingredients causing it to look like yellow butter"; or if it be "made or colored so as to resemble or be in imitation of yellow butter."

These words of the oleomargarine act have been the subject of legal contest at three important points. Those citizens who have been interested in this law, will be the better able to understand the legal difficulties with which the Dairy and Food Division has been confronted in its endeavor faithfully to enforce this law, after careful consideration of these points.

The pronounced yellow tints observed in much of the oleomargarine sold for some years past have undoubtedly been due in large degree to the use, as an ingredient in its making, of a deep yellow colored cottonseed oil. The experts for this Division have frequently testified that the use of this ingredient is not essential to the manufacture of oleomargarine. The defense has asserted that whether or not this be theoretically true, as a matter of fact the use of cottonseed oil is a commercial necessity in oleomargarine manufacture, and that its use as an ingredient can not, under the provisions of the present Constitution of Pennsylvania, be made a bar to the sale of such oleomargarine. Objection having been made in the case of Commonwealth vs. Mellet to the introduction of rebutting testimony by the Commonwealth to the effect that, even if cottonseed oil be deemed commercially necessary in oleomargarine manufacture, such qualities of the oil can be employed as shall not work the prohibited coloration, the case went up to the Superior Court upon this, with other points. In a decision written by Chief Justice Rice (Commonwealth vs. Mellet, 27 Superior 41) the Court said upon this point:

> "On the trial of an indictment for selling oleomargarine colored yellow to resemble butter, if it is competent for the defendant to prove that cottonseed oil is, in a commercial sense, a necessary constituent of oleomargarine, it is equally competent for the Commonwealth to introduce the explanatory proof in rebuttal that the necessary use of cottonseed is not to give the product in which it is used the color of yellow butter."

The second point of legal contest has related to the meaning of the word "coloration" above quoted. The national act laying a tax upon oleomargarine establishes a rate for oleomargarine which has been subjected to "coloration" much higher than that fixed for uncolored oleomargarine. Executive interpretation of the national act has given to the term "coloration" as therein used the meaning only of "artificial coloration," with the qualification that an oleomargarine which contains an ingredient of any nature, such for example as palm oil which, in its highly colored, unrefined state is not deemed by civilized peoples to be fit for use as a food, and which, in the case of oleomargarine, is employed solely for the purpose of imparting color thereto, is to be deemed to have been artificially colored. This qualified meaning of the word "coloration" should, it has been contended by oleo interests, be that given to the same word in the Pennsylvania act, and one or more of the district courts of the Commonwealth have so held. In the case previously mentioned, this point also went up to the Superior Court, which said:

> "On the trial of an indictment for selling oleomargarine 'made or colored so as to resemble or be in imitation of yellow butter,' a conviction may be sustained, although there is not evidence of the artificial coloration of the oleomargarine by the addition, thereto, in the process of manufacture or afterwards, of any substance which had no other function than to cause it to resemble and be an imitation of yellow butter. A consideration of the subject shows that the latter act is not to be given a construction which will restrict it to 'artificial coloration.'"

The third point of contest has been as to the interpretation of the words "yellow butter" as used in the statute. The contention of the defendants has commonly been that the legislative intent in the use of these words was to signify "standard yellow" butter, "commercially yellow" butter, butter of the color possessed by that made from the milk of grass-fed cattle in the month of June; and that, therefore, all oleomargarine possessing a yellow color of less depth or intensity, was legally salable in the State. This view of the meaning of the word "yellow" has been vigorously supported by testimony for the defense and by ingenious arguments by skillful attorneys in their employ. Indeed, the attempt has been made to give to the word "yellow," the meaning solely of the words "chrome yellow," since this color is sometimes used as a standard of reference by the painter and the physicist. The Commonwealth has contended that the words mean all that they would normally mean to the common people; that the adjective "yellow" as used in the act includes any tint that the common people would call "yellow" when appearing in butter. The ingenuity of the defense has in many cases thrown the minds of the jury into doubt as to the meaning of the word "yellow" in this connection, with consequent loss of verdicts for the Commonwealth; and this confusion has in some instances been shared even by those learned in the law, despite the finding by Judge Rice in the Mellet decision that it was not the purpose, in the oleomargarine act, to fix as a standard butter highly colored artificially nor something which may not have been, in fact, pure butter. In two appeals taken by defendants to the Superior Court upon this issue, that judicial body has, through opinions written by Judge Henderson, more explicitly than ever confirmed the correctness of the position taken by the Dairy and Food Division. The two cases here referred to are those of Commonwealth vs. Harris A. Clewell, (No. 145 October Term 1911), and Commonwealth vs. Alexander T. Ignativig, (No. 136 same Term). In the former of these two cases, the Court said:

> "The defendant asks us to declare that when the Legislature speaks of 'yellow butter' it means butter having the color of that product made in the month of June, but we are unable to find either in the words of the statute or from a consideration of the reasons leading to its enactment any warrant for such construction. As has been repeatedly stated the principal object of the act was to prevent deception by dealers in oleomargarine and it would be a remarkable inference that care was only exercised toward the safeguarding of the public against imposition as to butter made during one-twelfth of the year. Witnesses are not necessary to show that butter is not all of the same color whether made in the month of June or at any other time. Different shades of yellow appear in its production contingent on the breeds of cows, the feed used, the time of year in which it is made and the process of manufacture, and when the phrase 'yellow butter' is used we thing the Legislature intended to describe the general color

> inhering in that product. Any other construction would open every market to the sale of oleomargarine made in imitation of butter and no prohibition would exist except as to the imitation of the highest natural color of butter or of butter colored in imitation of it. This would defeat the very purpose of the act. It is our duty to give it a reasonable construction and to enforce it according to its spirit as well as its letter. If we should hold that the words 'yellow butter' are equivalent to 'commercial butter' as contended for by the appellant we would be deciding that the law forbids the sale of oleomargarine not made and kept free from all coloration or ingredients causing it to look like butter having the highest natural color of yellow or butter artificially colored in imitation of such highest natural color. This would be equivalent to re-enacting the statute and giving it an application and limitation which could not have been in legislative contemplation. The whole history of the legislation on this subject shows that what was aimed at is the prevention of fraud on the consumers by the sale to them of another substance as and for butter. It was recognized that oleomargarine when not artificially colored has a white or very light shade and that some butter because of the use of excessive heat in the making or some other cause might also be white or very light and that to make white butter a standard would be practical prohibition of the manufacture of oleomargarine at all. Hence, the qualifying word 'yellow.' But there was no attempt to fix an absolute shade of yellow nor intention to permit an imitation of all shades of butter except that which was colored to the highest degree of yellow which butter in its natural condition ever possesses. It was unimportant, therefore, to know what was recognized in the trade in New York or elsewhere as 'yellow butter.' It may be as stated by the learned counsel for the appellant that this is butter colored to imitate June butter and that the public taste at the large centres of trade demands this color, but a large part of the butter produced in the Commonwealth is consumed in the localities in which it is produced and is sold from farms and creameries to local customers. These consumers were within the view of the Legislature as well as dwellers in the largest cities and are entitled to the same protection. The yellow butter to which the act refers is not that sold in New York or Philadelphia alone but that which is produced on the farms and in the factories as well and is sold in its natural color or with the addition of coloring matter to increase its yellowness."

The explicit declaration of the Superior Court upon this color question will, we believe, make the successful conduct of prosecutions against the vendors of highly colored yellow oleomargarine much more certain in result than it has been for many years past. Indeed, since the handing down of those decisions there has been very little oleomargarine of pronounced yellow color appearing on sale in the State.

## CONFECTIONERY IS FOOD

In the case of Commonwealth vs. Pflaum, heard before the Court of Quarter Sessions of Philadelphia county, in March, 1911, the defense raised the points that since the title of the general food act does not specifically mention confectionery, the act is invalid so far as this particular article of commerce is concerned; that inasmuch as the act tolerates the presence of sulphur dioxide under certain conditions in dried fruits and molasses, it is unconstitutional to prohibit the addition of this chemical to confectionery; also that the act itself is unconstitutional because it discriminates in freeing retail dealers from prosecution in cases in which they have sold under guaranty from the manufacturer or wholesaler, and finally, that even if the addition of sulphur dioxide directly to confectionery is prohibited, this prohibition cannot apply in cases where the chemical is introduced only very indirectly as a constituent of a single ingredient of the confectionery.

This case was one in which confectionery purchased from the defendant by one of the agents of the Division was, upon analysis by Dr. C. H. LaWall, one of the chemists of the Division, found to contain sulphur dioxide. The prosecution in the Philadelphia courts resulted from this finding and the verdict of guilty was recorded. The defendant thereupon entered a motion in arrest of judgment. A decision in favor of the defense having been given, the Commonwealth appealed the case to the Superior Court which in its decision of October, 1911, reversed the finding of the lower court as to the unconstitutionality of the act. Thereupon the defense appealed the case to the Supreme Court, before whom it was argued in the January Term of 1912. The case for the Commonwealth was handled in a very able manner by E. C. Rhoads, Esq., of Philadelphia, and by the Hon. W. M. Hargest, Assistant Deputy Attorney General, to whose able and cordial assistance in this and other legal matters the Division is much indebted, and also by the Hon. John C. Bell, Attorney General for the Commonwealth. The judgment of the Supreme Court is given in full in an appendix hereto, but we may state briefly in this connection that the Court decided that the present title of the act is sufficiently comprehensive to give notice of the prohibition as to adding sulphur dioxide to confectionery, inasmuch as confectionery is a food; that the distinction between dried fruits and molasses, on the one hand, and all other foods, including confectionery, on the other, as respects the addition of sulphur dioxide, is not a discrimination in violation of the Constitution, but is competent for the Legislature as an exercise of its powers of classification, so the act is not open to the objection of unlawful classification and discrimination because it relieves retailers from prosecution when they are possessed of a guaranty from the manufacturer or wholesaler, and finally, that the fact that the sulphur dioxide was added indirectly, as above described, is not material.

## DIVISION OF OFFICIAL SAMPLES

The Commissioner is in frequent receipt of requests from defendants charged with the adulteration or misbranding of foods, for the delivery to them to be examined by their own experts, of portions of the official sample. Such requests are consistently refused because, under the decision of Judge Bell, of the Blair county court, in the case of Commonwealth vs. Koller et al., not only was the right of the Commonwealth to refuse such requests affirmed, but also the duty of such refusal was implied because of the fact that the form of the pure food law being that of a criminal law, it becomes necessary that the Commonwealth shall prove its case beyond a reasonable doubt in order to obtain a verdict for the people. The reasons for the judgment are stated in an able brief presented to the Court in that case by Hon. A. H. Woodward, General Counsel for the Division, and in the opinion of the Court, both of which are printed in the appendix hereto.

Notwithstanding the fact that under this decision the policy will be consistently followed of declining to place portions of the official sample in the hands of the defense for examination by parties unknown to the Commonwealth, it is not the intent to assume that the agents and chemists of this Division are infallible, and wherever practicable precautions are taken to hold a sufficient portion of the original official sample for re-analysis should a reasonable doubt arise as to the correctness of the primary report on which prosecution is based, and under certain well defined conditions, the Commissioner stands ready to arrange for a check analysis of the reserve portion of the sample by competent chemists representing both the Division and the defendants. In other words, it is not the aim of the Division simply to win cases upon technicalities. Its duty is to protect the people. This duty does not, however, require anything but square dealing with the producer, manufacturer and dealer.

## MONTHLY BULLETIN

The Monthly Bulletin of the Bureau has been continuously published throughout the year for the purpose, as in the past, of currently informing the public concerning the work of the Bureau and upon subjects relating thereto. The continued public demand for this Bulletin shows its value for the purposes here indicated.

In addition to these Monthly Bulletins, the Division has issued four special bulletins during the year, which have appeared in the general departmental series: No. 216, "Cheap Confectionery," by Charles H. LaWall, Chemist; No. 221, "Preliminary Report of the Dairy and

Food Commissioner for the Year 1911"; No. 224, "Commercial Table Syrups and Molasses," by Wililam Frear, Chemist; No. 232, "Law Bulletin."

In the Bulletin first mentioned, Dr. LaWall reports the results of the examination of 259 samples of cheap candies, chiefly "penny goods." In the Bulletin No. 224, Dr. Frear likewise presents the results of the examination of a large number of samples of table syrups and molasses officially sampled by agents of the Division, and discusses in a popular way the methods of manufacture and raw materials used for these commodities. In Bulletin No. 232 is given, in addition to the laws with whose enforcement the Division is charged and the regulations for the enforcement thereof, a highly valuable digest of decisions relative to food laws, prepared by the Hon. A. H. Woodward, General Counsel of the Division. The demand for these bulletins has been large, and it is believed that by their issue the Division has performed an important service to the people of the Commonwealth.

## SUMMARY OF WORK FOR THE YEAR 1912

In the Appendix to this report are presented summaries showing the list of articles purchased by the agents and analyzed by the chemists of the Bureau during the year, and also a table giving a list of those classes of articles found adulterated and misbranded, and made the bases of prosecutions that have been terminated during the year. The recapitulation of samples analyzed during 1912 shows a total of 7,204, a number somewhat smaller than that for the year 1911. The difference is due to the smaller number of milk samples analyzed during the past year as compared with that for the preceding year. As a matter of fact, the analyses of other classes of food products were nearly 600 more than in 1911. The number of cases terminated in 1912 was 1,049, the largest annual number since the creation of the Bureau.

In the following portion of this report the several classes of food products analyzed will be considered separately in detail.

### DAIRY PRODUCTS

The number of milk samples examined during 1912 was 3,321, including 44 samples sold as skim-milk. There were prosecuted and terminated during the year 294 cases, in which skimming, watering, or deficiency in the standard had been found. This is equivalent to a little less than 9 per cent. of the total number of samples examined. There were also 6 cases terminated in which the charge was the addition of preservative, comprising 5 cases formaldehyde and 1 case boric acid. The number of instances of such adulteration were even less than in 1911.

There were examined during 1912, 802 samples of cream, and 88 cases, corresponding to about 11 per cent. of the whole, were prosecuted to a termination because of a deficiency in the standard of fat.

Five hundred and twenty-eight samples of butter were examined and 4 prosecutions respecting this material were terminated; 3 in which the charge was the presence of an excessive amount of water, and 1 on account of an unwholesome and poisonous condition of the article at the time of sale.

Eleven samples of cheese were examined with but 1 prosecution terminated under the Act of 1897, because of misbranding.

## OLEOMARGARINE

Of this material, 113 samples were examined during the year and 58 cases were prosecuted to termination for violations of the oleomargarine act of 1901. Of these 58 cases, 25 were on account of the yellow color of the oleomargarine, 21 because of selling without a license or without proper signs, and 12 were for selling the oleomargarine as butter.

As remarked in a previous paragraph, there has been a marked improvement in the observance of the law with respect to the color under which oleomargarine may be legally sold, and it is the earnest hope that the present condition, the definite interpretation of the law in this particular may result in its being rarely violated and in the full protection of the vendors of butter and oleomargarine, respectively, and of the consumers thereof from the disadvantages accruing to each where the violations of the provisions of this law are frequent.

## RENOVATED BUTTER

Of this commodity, 10 samples were examined during the year and 1 case terminated for a sale without proper marking and without license.

## ICE CREAM

Of these materials, 337 samples were examined and 48 cases were terminated, all of them upon the charge that the respective samples fell below the established standard for fat. The proportion between these numbers is 7 to 1; that is to say, of samples collected about one-seventh failed to meet the present lenient requirements of composition established by the present ice cream act.

## MEATS

Of the various meat preparations, including not only the fresh meats, but also the various package meats, 51 samples were analyzed. Four cases were terminated in which the article involved was Hamburger steak, reported by the chemist as containing added sulphites. As 24 samples of Hamburger steak were analyed, this corresponds to 1 sample thus adulterated out of every 6 examined. This condition is far from being satisfactory and yet it is a great improvement over what has been observed in earlier years. Of the various meat samples examined, 13 cases were terminated on charges brought for the contaminated and decomposed condition of the articles. It should, of course, not be inferred that the proportion here represented corresponds to that obtaining in the meat trade in general, for the reason that samples of fresh meat were rarely taken except where there was good reason to believe that the articles were not sound. The adulteration of fresh meat preparations is very rare, so that little reason exists for wholesale examination of these commodities except with respect to their soundness and freedom from contamination by flies, dust, etc.

Of sausage, 109 samples were analyzed during the year and 25 cases terminated in which the charge was because of the addition of vegetable flour or cereals, and 14 of these cases because of the addition also of water in excess of the amounts normal to the meats in the sausage; 2 cases were terminated upon charges of the addition of sulphites; 7 cases were terminated in which the charge was the selling of sausage decomposed or putrid, and thus unfit for food. The percentage of cases terminated is much greater than for the year 1911, but as a matter of fact, a large fraction of these cases were begun in that year. The condition of sausages now on sale is very greatly better than a first glance at the figures here given would indicate, for the reasons just stated.

Thirty-six samples of fish and oysters were examined and 2 cases terminated, in which the charge was the sale of oysters containing added water.

## LARD

Of this product, 12 samples were examined, 4 of them having been sold under declaration of their compound nature. Six cases were terminated in which this article was concerned, 5 of the prosecutions having been instituted because of adulteration by the addition of beef stearin or cottonseed oil, and 1 because the article was compound, and not branded as the law requires.

## EGGS

One hundred and sixty-four samples of eggs, cracked, dried, frozen, liquid, opened and in the shell were examined during the year, and 31 cases were terminated on the charge of having been sold or offered for sale when in condition unfit for use as food. The larger fraction of the violations of the egg act of 1909 have been found in the two principal cities of the Commonwealth. In one case, in Philadelphia, the quantity involved was four and one-half tons. Three cases were terminated in which the charge was misbranding, and that the eggs were sold as and for fresh eggs when, in fact, they were not so.

### MINCE MEAT

Of these products, 9 samples were examined and a single case terminated on the charge of containing benzoic acid without declaration, as the law requires.

## FRUIT AND VEGETABLE PRODUCTS

### CANNED FRUITS AND VEGETABLES

Of these, 94 samples were examined during the year, with but one case affecting vegetables terminated, in which the charge was the addition of sulphate of copper to a lot of peas. Upon the whole the condition of the canned products examined was such as to eliminate criticism. And three cases were terminated affecting Maraschino cherries, the charge being the addition, undeclared, of benzoate of soda or sulphur dioxide.

### CATSUPS, ETC.

Of catsups, salad dressings, table oils, etc., 368 samples were examined. Cases were terminated affecting these materials, as follows: Catsup containing excessive amounts of sodium benzoate, 66; containing saccharin, 9, and because of decomposition, or manufactured from decomposed material, 7; India relish containing saccharin, 1; olive oil adulterated with cottonseed oil, or imitated thereby, 5.

The chief subject of adulteration in this group of materials is catsup. The large number of cases in which benzoate of soda is found in excess of the amount legally tolerated, is noteworthy. It is furthermore worthy of note that with the application of improved methods now available for determining the soundness of this commodity, a considerable fraction of the samples examined have been found to be decomposed, and in many cases to have been manufactured from materials decomposed when used.

## DRIED FRUITS AND VEGETABLES

Of these, 229 samples were examined and 116 cases were terminated, because the vendors failed to declare, as required by the law, the presence of the sulphur dioxide with which these dried fruits had been treated. Reports of the agents indicate that the containers in which these dried fruits are shipped by the packers and wholesalers usually bear the required declaration and that, in many cases, the invoices are so marked as distinctly to inform the retail merchant of the presence of this preservative. The unfortunate frequency with which the law is violated in the retail sales of these commodities is, therefore, the result of neglect on the part of the merchant or his employes. It was the purpose of the Legislature, by means of the required declaration, to see that the consumer was warned of the presence of this undesirable preservative, so that opportunity for refusing the product might be afforded, and if the purchase were made with the warning, that the housewife might have notice so that such methods of washing, cooking, etc., might be applied as to reduce to a minimum the quantity of sulphur dioxide in the food at the time it was eaten. There were 2 cases terminated because the dried fruits were contaminated and decomposed in such manner as to render them unfit for food.

## FRUIT BUTTERS, JAMS, JELLIES AND PRESERVES

Of these products, 32 samples were examined during the year. A prosecution was terminated in one case involving an adulterated jelly.

## NUTS

Thirteen samples of various kinds of nuts were examined and 2 cases terminated, in which the charge was that the nuts were decayed and filthy. The condition of the nuts now on sale shows a decided improvement over that manifested in recent years.

## VINEGAR

Of this class of products, 78 samples were examined by the Division chemists, and 38 cases were terminated, of which 28 were prosecuted on the charge of added water and, in some cases, apple solids which had not undergone the alcoholic and acetous fermentations. In 6 cases distilled vinegar had been sold as pure cider vinegar; in several cases this vingear had been colored contrary to law, and in 1 case had less than the standard requirement of acetic acid.

Two contests have been made in as many district courts of the Commonwealth, with the intent on the part of the defendants of securing from the courts a decision that the addition of water or of apple solids not contained in vinegar is not in violation of the vinegar act of 1901. One of these courts sustained the contention of the defense in this particular, but a later decision by another court sustained the position of this Division, that such additions would constitute violations of that act.

## BAKERY MATERIALS

Of these raw materials other than those already considered, 120 samples were examined during the current year and 10 prosecutions were terminated. Of these, 7 involved cases in which the charge was the addition of nitrous acid to flour; 1 the sale of corn meal, sour and unfit for food, and 2 the sale of gelatine containing sulphites.

## FLAVORING EXTRACTS

Of these, 44 samples were examined by the analysts of the Division in 1912, and 4 cases were terminated under the charge of adulteration. Those who are familiar with the reports for the earlier years of this Division's operations, will note the vast improvement in the quality and honesty of labeling of these flavoring materials.

## BAKERY PRODUCTS

Fifty-eight different bakery products were examined in 1912, and 7 cases were terminated in which the charges involved, in 6 cases, the exposure of these materials in such manner as to render them unfit for human consumption, and in 1 instance, the addition of coloring matter to cake in such manner as to indicate the presence of eggs when the latter were absent.

## BREAKFAST FOODS

Three samples which the agents suspected of being in condition unfit for sale for use as food were submitted to the analysts and, in each case, with the confirmation of the judgment of the agents. The prosecution was terminated in each of these cases.

The Commissioner took special pains to call the attention of the retail trade to the importance of carefully examining the stocks carried over the summer months, so that the dealers might thus reject all that appeared unfit or doubtful. Consequently, the agents were directed to give special attention to these stocks. It was evident that the dealers, for the most part, exercised due care and thus protected their consumers from the use of these undesirable, deteriorated parts.

## CANDY

Sixty-three samples of various kinds of confectionery were analyzed in 1912 and 28 prosecutions were terminated involving adulteration of this group of commodities. In 12 of the cases thus terminated, the charge was that sulphur dioxide was present; in 3 that paraffin was present; in 3 that the name indicated the presence of chocolate, whereas no chocolate could be found; and in the 3 the charge was the coating of the material with resinous glaze. The general condition of the confectionery on sale in Pennsylvania has distinctly improved during the past year, as respects the use of resinous glaze, of which very little now appears. In other respects the comments made in the preliminary report of 1911 apply equally well to the conditions for the past year.

## HONEY AND SYRUPS

But 15 samples of this description were examined during the year 1912. No cases for adulteration of these materials have been terminated during the year. The general condition of market goods of this group is fully discussed in Bulletin 224, earlier mentioned, copies of which are available for the information of all who are especially interested in these materials.

## FRUIT SYRUPS

Of these, 31 samples were examined by the Division's chemists in 1912, and 15 cases were terminated, all involving strawberry syrup to which saccharin had been added.

## NON-ALCOHOLIC DRINKS

The chemists of the Department examined 453 samples of non-alcoholic drinks in 1912, and 107 cases were terminated, in 83 of which the presence of saccharin was the ground for prosecution. A considerable proportion of the remaining cases were instituted because of the undeclared presence of benzoic acid; a number because the materials were sold under misleading names; and 1 case in which an article sold as sweet cider was found to contain considerable quantities of alcohol.

## SPICES AND MISCELLANEOUS

There were examined during 1912, 11 samples of spices and 85 samples of miscellaneous materials. No case was terminated for the adulteration of spice, a condition vastly improved over that which appeared some years ago. Among the miscellaneous products, 17 samples of coffee preparations were examined and 4 cases were terminated, in which other materials had been substituted in part for coffee. A few of the miscellaneous materials were so-called fresh fruits and vegetables, for some of which prosecutions were terminated because of the unfit condition of the materials for human consumption.

## GENERAL CONDITIONS

Of the adulterations represented in the 1,049 cases terminated during the year, 709, that is nearly 25 per cent., were represented by adulterated or deficient samples of milk and cream; 10 per cent. by adulterated non-alcoholic drinks; and 20 per cent. by bad eggs, adulterated fruit syrups, ice creams, oleomargarine, sausage and vinegar. All remaining classes of food substances were represented by only 30 per cent. of the cases terminated, two-thirds of these being cases in which saccharin or benzoic acid had been added, in excess, to catsups, or in which sulphur dioxide was present, undeclared, in dried fruits, leaving but 10 per cent. of the cases affecting the great variety of other food products subject to the supervision of food control. Speaking in very general terms, the several classes of food products just named are represented by 6,000 samples examined and 950 cases terminated. The remaining classes of food products are represented by 1,250 samples examined and 100 cases terminated. The large proportion of adulteration is represented in the groups first above named, and only a very small fraction are the principal food commodities which constitute the major portion of the food supply of the Commonwealth.

Especial mention ought to be made of the Division's efforts to enforce the provisions of paragraph 6, section 3, of the food act of May 13, 1909, a paragraph relating to the adulteration of foods by contamination and decomposition. The terms of this paragraph of the act are very general and in some respects are such as to make difficult the successful prosecution of offenders as to these particulars. Nevertheless, there have been successfully terminated during the past year, for offenses under this paragraph of the general food law, 58 cases, and we are happy to report that while the conditions of keeping perishable food supplies are still far from ideal the campaign made during the summer of 1912 has resulted in a very marked improvement in the vendors' care upon these points.

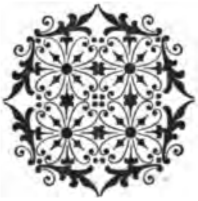
## FINANCIAL STATEMENT

The financial statement appended hereto shows receipts for 1912 amounting to $136,125.49, and expenditures for the corresponding period of $82,049.65. Speaking in round numbers, the receipts for 1910 showed an advance of $34,000 over those for 1909; those for 1911, a further increase of $10,000, and those for the past year an increase of nearly $16,000. As the expenditures of the Bureau have consistently remained at about $80,000 per annum, the amount appropriated therefor by the Legislature, we venture to renew the expression, in our judgment, that in view of the receipts of the Bureau as well as of the great value of the work it performs for the public, there is no good reason why the sums it requires should not be freely provided for the maintenance of its work.

## CONCLUSION

In the performance of the work of 1912 the Commissioner is indebted, as during the preceding year, for the continuous encouragement and support given by the Governor of the Commonwealth, the Hon. John K. Tener, and the Secretary of Agriculture, Hon. N. B. Critchfield. The Commissioner desires also to acknowledge the hearty co-operation given to him by the Attorney General's Department and by the public press of the State, and last, but not least, his appreciation of the efficient and loyal assistance of the special agents, chemists, special counsel and office force of the Bureau.

JAMES FOUST,
*Dairy and Food Commissioner.*



# APPENDIX

## SUMMARY

**The following gives a list of articles analyzed by Chemists of this Bureau during the year 1912.**

| Article. | Number Analyzed. |
|---|---|
| **DAIRY PRODUCTS:** | |
| Butter, | 528 |
| Cheese, | 11 |
| Cream, | 802 |
| Milk, butter, | 1 |
| Milk, condensed, | 4 |
| Milk, evaporated, | 11 |
| Milk, skimmed, | 44 |
| Milk, | 3,277 |
| | 4,678 |
| **OLEOMARGARINE,** | 113 |
| **RENOVATED BUTTER,** | 10 |
| **EGGS (Cracked, dried, frozen, liquid, opened and in shell),** | 164 |
| **BREAD, CAKES, PIES AND PUDDINGS:** | |
| Bread, | 2 |
| Cakes, Assorted, | 3 |
| Cake, Coffee, | 1 |
| Cake, Drop, | 1 |
| Cake, Jelly Roll, | 2 |
| Cake, Layer, | 1 |
| Cake, Marble, | 1 |
| Cake, (no name given), | 5 |
| Cake, Pound, | 5 |
| Cake, Sponge, | 5 |
| Cake, Sponge with custard, | 1 |
| Cake, Wine, | 1 |
| Cream Nut Patties, | 1 |
| Cream Puffs, | 20 |
| Ginger Snaps, | 2 |
| Lady Fingers, | 1 |
| Tea Bunns, | 1 |
| Pie, Custard, | 1 |
| Pie, Lemon, | 1 |
| Pie (no name given), | 1 |
| Pie, Peach, | 1 |
| Pudding, Plum, | 1 |
| Gellatin, | 2 |
| Jello, | 1 |
| | 61 |
| **CANNED FRUITS AND VEGETABLES:** | |
| Asparagus, | 2 |
| Beans, Baked, | 1 |
| Cherries, | 7 |
| Cherries, Bigarreaux, | 2 |
| Cherries, Cocktail, | 1 |
| Cherries, Maraschino, | 31 |
| Corn, | 4 |
| Figs in Maraschino, | 1 |
| Mincemeat, | 9 |
| Mushrooms, | 5 |
| Peas, | 10 |
| Peas, French, | 6 |
| Pickles, Sour, | 1 |
| Pickles, Sweet, | 5 |
| Spaghetti, | 1 |
| Strawberries, | 1 |
| Tomatoes, | 7 |
| | 94 |

## SUMMARY—Continued

| Article. | Number Analyzed. |
|---|---|
| **CATSUPS, OIL, SALAD DRESSING, SAUCES, ETC.:** | |
| Catsup (no name given), | 111 |
| Catsup, Tomato, | 203 |
| Horseradish, | 3 |
| Horseradish Dressing, | 1 |
| Ketchup, Tobasco, | 2 |
| Mango Chutney, | 1 |
| Oil, Olive, | 40 |
| Relish, Cucumber, | 1 |
| Salad Dressing, | 1 |
| Sauce, Challenge, | 1 |
| Sauce, Chili, | 1 |
| Sauce, Worcestershire, | 3 |
| | 368 |
| **CONFECTIONERY:** | |
| Burnt Peanuts, | 1 |
| Candied Fruit, Assorted, | 1 |
| Candied Fruit, Mixed, | 1 |
| Candied Pears, | 1 |
| Candy, | 1 |
| Candy Apples, | 1 |
| Candy, "Baby Creams," | 1 |
| Candy Bananas, | 1 |
| Candy Cracker Jack, | 1 |
| Candy Hearts, | 2 |
| Candy Kisses, | 1 |
| Candy "Lolly Pops," | 2 |
| Candy Macaroni, | 1 |
| Candy Peach Tarts, | 1 |
| Candy Prize Boxes, | 1 |
| Candy Sandwiches, | 1 |
| Candy Shortcake, | 1 |
| Candy Strawberries, | 2 |
| Candy Suckers, | 1 |
| Candy Wafers, | 1 |
| Candy Zig Zag, | 2 |
| Chocolate Candy, | 1 |
| Chocolate Candy Suckers, | 1 |
| Chocolate Coated Eggs, | 2 |
| Chocolate Coated Rabbits, | 2 |
| Chocolate Cream Candy Cake, | 1 |
| Chocolate Marshmallow Eggs, | 1 |
| Cocoanut Bonbons, | 1 |
| Cocoanut Candy, | 2 |
| Cream Candy, | 1 |
| Fudge (Cocoanut and Walnut), | 1 |
| Fudge (no flavor given), | 2 |
| Jelly Beans, | 1 |
| Jelly Eggs, | 2 |
| Marshmallows, | 6 |
| Marshmallow Cones, | 1 |
| Marshmallows, Toasted, | 1 |
| Mixed Candy, | 1 |
| Nut Candy, | 2 |
| Nut Caramels, | 1 |
| Nut Taffy, | 1 |
| Peanut Candy, | 4 |
| Salt Water Taffy, | 1 |
| Taffy, | 1 |
| Turkish Candy, | 1 |
| | 63 |
| **CORNSTARCH, CORNMEAL AND FLOUR:** | |
| Cornstarch, | 2 |
| Cornmeal, | 3 |
| Flour, Buckwheat, | 15 |
| Flour (Buckwheat and Wheat Flour Compound), | 1 |
| Flour, Pancake, | 2 |
| Flour, Prepared Cake, | 1 |
| Flour, Wheat, | 93 |
| | 117 |

## SUMMARY—Continued

| *Article. | Number Analyzed. |
|---|---|
| **DRIED FRUITS:** | |
| Apples, | 1 |
| Apricots, | 71 |
| Peaches, | 106 |
| Pears, | 1 |
| Prunes, | 4 |
| Raisins, | 46 |
| | 229 |
| **FLAVORING EXTRACTS:** | |
| Extract, Almond, | 1 |
| Extract, Lemon, | 10 |
| Extract, Orange, | 1 |
| Extract, Peppermint, | 1 |
| Extract, Raspberry, | 1 |
| Extract, Vanilla, | 21 |
| Extract, Vanilla and Tonka, | 1 |
| Flavoring Extract, | 2 |
| Flavor, Peach, | 1 |
| Flavor, Pineapple, | 2 |
| Flavor, Raspberry, | 1 |
| Flavor, Strawberry, | 2 |
| | 44 |
| **FRUIT, BUTTERS, JAMS, JELLIES AND PRESERVES:** | |
| Butter, Apple, | 2 |
| Butter, Peanut, | 7 |
| Jam, Apricot, | 1 |
| Jam, Compound, | 1 |
| Jam, Fig, | 1 |
| Jelly, Apple, | 3 |
| Jelly, Apple and Grape, | 1 |
| Jelly, Apple and Orange, | 1 |
| Jelly, Apple and Quince, | 1 |
| Jelly, Apple and Corn Syrup, | 2 |
| Jelly, Red Currant, | 1 |
| Marmalade, Grape Fruit, | 1 |
| Marmalade, Scotch, | 1 |
| Preserves, Apple and Strawberry, | 2 |
| Preserves, Fig, | 2 |
| Preserves, Grape, | 1 |
| Preserves, Peach, | 1 |
| Preserves, Plum, | 1 |
| Preserves, Strawberry, | 2 |
| | 32 |
| **FRUIT SYRUPS:** | |
| Orange, | 1 |
| Raspberry, | 3 |
| Strawberry, | 27 |
| | 31 |
| **HONEY AND SYRUPS:** | |
| Honey, | 3 |
| Molasses, New Orleans, | 2 |
| Syrup, Cane and Maple, | 2 |
| Syrup, Corn, | 1 |
| Syrup, Golden Tree, | 1 |
| Syrup, Maple, | 5 |
| Syrup, Table, | 1 |
| | 15 |
| **ICE CREAMS:** | |
| Ice Cream, Cherry, | 1 |
| Ice Cream, Chocolate, | 36 |
| Ice Cream, Maple, | 1 |
| Ice Cream, Maple-Walnut, | 2 |

## SUMMARY—Continued

| Article. | Number Analyzed. |
|---|---|
| ICE CREAMS—Continued. | |
| Ice Cream (no flavor given), | 5 |
| Ice Cream, Peach, | 7 |
| Ice Cream, Pineapple, | 2 |
| Ice Cream, Strawberry, | 40 |
| Ice Cream, Vanilla, | 285 |
| Ice Cream, Walnut, | 8 |
| | 387 |
| LARD: | |
| Lard, | 8 |
| Lard, Compound, | 4 |
| | 12 |
| FISH—CANNED, DRIED AND FRESH: | |
| Codfish, Fresh, | 4 |
| Codfish, Dried, | 4 |
| Codfish, Shredded, | 2 |
| Crabs, Deviled, | 1 |
| Fish, Fresh, | 2 |
| Lobster, Canned, | 1 |
| Salmon, Canned, | 2 |
| Salt Fish, Dried, | 1 |
| Sardines, Canned, | 5 |
| Oysters, Canned, | 2 |
| Oysters, Fresh, | 12 |
| | 36 |
| MEATS—CANNED AND FRESH: | |
| Bacon, Fresh, | 1 |
| Beefsteak, | 2 |
| Beef, Chipped, | 1 |
| Beef, Sliced, Canned, | 1 |
| Chicken, Fresh, | 2 |
| Corned Beef, | 1 |
| Corned Beef Hash, | 1 |
| Duck, Fresh, | 1 |
| Hamburger Steak, Fresh, | 24 |
| Ham, Boiled, | 1 |
| Ham, Minced, Canned, | 1 |
| Ham, Pressed, | 2 |
| Meat, Boiled, | 1 |
| Meat, Fresh, | 5 |
| Mutton, Fresh, | 1 |
| Potted Beef, | 1 |
| Potted Meat (Beef and Ham Flavor), | 1 |
| Potted Meat (Ham Flavor), | 2 |
| Veal, Fresh, | 2 |
| | 51 |
| SAUSAGE: | |
| Sausage, Bologna, | 16 |
| Sausage, Canned, | 4 |
| Sausage, Fresh, | 13 |
| Sausage, Fresh Pork, | 54 |
| Sausage, German Style, | 3 |
| Sausage, Half-smoked, | 1 |
| Sausage, Lunch, | 1 |
| Sausage, Vienna, | 16 |
| Sausage, Wiener, | 1 |
| | 109 |
| NON-ALCOHOLIC DRINKS: | |
| "Beerine," | 1 |
| Birch Beer, | 24 |
| Cherry Cheer, | 1 |
| Cherry Snap, | 1 |
| Cherry Ze-Ro, | 1 |

## SUMMARY—Continued

| Article. | Number Analyzed. |
|---|---|
| **NON-ALCOHOLIC DRINKS—Continued.** | |
| Cider, Champagne, | 1 |
| Cider, Cherry, | 1 |
| Cider, Fruit, | 1 |
| Cider, Sweet, | 6 |
| Coco Cola, | 8 |
| Crescent Beer, | 1 |
| Ginger Ale, | 38 |
| Grape Juice, | 6 |
| Iron Ale, | 2 |
| Iron Beer, | 1 |
| Jersey Creme, | 1 |
| Lemonade, | 1 |
| Lemon Juice, | 1 |
| Lemon Sour, | 8 |
| Lithia Water, | 2 |
| Malt Brew, | 2 |
| Marrowfood, | 2 |
| Merry Widow High Ball, | 1 |
| "Near Beer," | 6 |
| Nectar, | 1 |
| Nep-to, | 1 |
| Orangeade, | 8 |
| Orange Julep, | 1 |
| Pineapple Juice, | 1 |
| Pop, Birch, | 10 |
| Pop, Cherbo, | 1 |
| Pop, Chocolate, | 1 |
| Pop, Lemon, | 9 |
| Pop (no flavor given), | 8 |
| Pop, Orange, | 4 |
| Pop, Raspberry, | 1 |
| Pop, Red, | 6 |
| Pop, Strawberry, | 32 |
| Pop, White, | 4 |
| Pop, Yellow, | 1 |
| Rasport, | 1 |
| Root Beer, | 10 |
| Sarsaparilla, | 27 |
| Soda, Birch Compound, | 1 |
| Soda, Cherry, | 1 |
| Soda, Chocolate, | 2 |
| Soda, Cream, | 20 |
| Soda, Ginger, | 1 |
| Soda, Lemon, | 24 |
| Soda (no flavor given), | 96 |
| Soda, Orange, | 9 |
| Soda, Peach, | 1 |
| Soda, Red, | 8 |
| Soda, Strawberry, | 61 |
| Soda, Vanilla, | 2 |
| Temperance Brew, | 1 |
| "Tonica," | 1 |
| Vin Fiz, | 1 |
| Wee Beer, | 1 |
| Weiss Beer, | 1 |
| Whannis Table Water, | 1 |
| "White Ribbon," | 1 |
| Wini Vina, | 1 |
| | 453 |
| **NUTS:** | |
| Black Walnuts, | 2 |
| Chestnuts, | 5 |
| Cream Nuts, | 2 |
| English Walnuts, | 4 |
| | 13 |
| **SPICES, ETC.:** | |
| Cinnamon, Ground, | 1 |
| Ginger, Ground, | 1 |
| Mustard, | 2 |
| Mustard, Prepared, | 4 |
| Pepper, Black, Ground, | 2 |
| Pepper, Red, Ground, | 1 |
| | 11 |

## SUMMARY—Continued

| Article. | Number Analysed. |
|---|---|
| **VINEGAR:** | |
| Vinegar, Apple, | 4 |
| Vinegar, Cider, | 67 |
| Vinegar, Distilled, | 4 |
| Vinegar (no name given), | 1 |
| Vinegar, Standard, | 1 |
| Vinegar, White, | 1 |
| | 78 |
| **MISCELLANEOUS PRODUCTS:** | |
| Aniseed, | 1 |
| Apples, | 2 |
| Cocoanut, Shredded, | 1 |
| Coffee "Combination," | 1 |
| Coffee, Ground, | 10 |
| Coffee, Whole, | 5 |
| Coffee and Sugar, | 1 |
| Crisco, | 1 |
| Cucumbers, | 1 |
| Custard Powder, | 3 |
| Dates, | 1 |
| De Zerta, | 1 |
| Egg Powder, | 1 |
| Figs, | 1 |
| Food (no name given), | 1 |
| Fresh Fruit (no name given), | 2 |
| Grape Fruit, | 1 |
| Guava Jelly, | 1 |
| Ice Cream Cones, | 3 |
| Jelly Powder (Raspberry Flavor), | 1 |
| Maple Corn Flakes, | 1 |
| Matzoth Meal, | 1 |
| Mother's Crushed Oats, | 1 |
| Noodles, | 12 |
| Oranges, | 3 |
| Peaches, | 3 |
| Pie Preparation, | 1 |
| Potatoes, | 2 |
| Rice, | 4 |
| Soup, Tomato, | 1 |
| Soup Ringlets, | 1 |
| Strawberries, Fresh, | 1 |
| Sugar, Granulated, | 3 |
| Sugar, Powdered, | 6 |
| Tea, Green, | 1 |
| Tea Siftings, | 1 |
| Tomato Paste, Canned, | 1 |
| Tumeric, | 1 |
| Whiskey, | 2 |
| | 85 |

### RECAPITULATION.

| | |
|---|---|
| Butter, | 528 |
| Cheese, | 11 |
| Cream, | 802 |
| Milk, | 3,337 |
| Oleomargarine, | 113 |
| Renovated Butter, | 10 |
| Eggs, | 164 |
| Fresh Meat, | 38 |
| Fruit Syrup, | 31 |
| Ice Cream, | 337 |
| Lard, | 12 |
| Non-Alcoholic Drinks, | 453 |
| Sausage, | 109 |
| Vinegar, | 78 |
| Food, | 1,181 |
| | 7,204 |

# NUMBER OF SAMPLES PURCHASED BY THE DAIRY AND FOOD AGENTS DURING YEAR 1912

| Agent. | Number. |
|---|---|
| F. J. Whalen, | 914 |
| G. M. Pelton, | 619 |
| H. P. Cassidy, | 563 |
| James McGregor, | 540 |
| Robert M. Simmers, | 517 |
| C. C. Linton, | 478 |
| Archie Billings, | 469 |
| J. B. Kliniewski, | 381 |
| P. J. Magee, | 375 |
| M. .J Walsh, | 324 |
| E. F. McCann, | 321 |
| W. F. Hill, | 292 |
| J. Jamison, | 244 |
| H. L. Banzhoff, | 226 |
| H. M. Gooderham, | 206 |
| John Jenkins, | 203 |
| E. P. Jones, | 176 |
| Daniel Seiler, | 139 |
| E. D. Miller, | 129 |
| I. J. Hughes, | 38 |
| W. E. Supplee, | 9 |
| .J H. Gaunt, | 2 |
| G. T. Fleming, member of Erie Board of Health, | 16 |
| E. P. Loesch, member of Erie Board of Health, | 16 |
| Philadelphia Board of Health, | 7 |
| | 7,204 |

## CASES TERMINATED

THE FOLLOWING TABLE GIVES A LIST OF ARTICLES ANALYZED BY CHEMISTS AND FOUND TO BE IN VIOLATION OF THE FOOD LAWS, AND THE NUMBER OF SAMPLES OF EACH PRODUCT ON WHICH PROSECUTIONS WERE BASED AND TERMINATED.

| | |
|---|---|
| CHEESE ACT, 1897, IN VIOLATION OF | |
| Cheese, Cream, misbranded, | 1 |
| | 1 |

| | |
|---|---|
| EGG ACT, 1909, IN VIOLATION OF | |
| Eggs unfit for food, | 30 |
| in bakery, | 1 |
| | 31 |

| | |
|---|---|
| FOOD ACT, 1909, IN VIOLATION OF | |
| Apples, decomposed, | 2 |
| Apricots, containing sulphur dioxide, not declared, | 4 |
| Dried, containing undeclared sulphites, | 2 |
| containing sulphur dioxide, | 5 |
| containing sulphur dioxide, not declared, | 11 |
| containing undeclared sulphites, | 13 |
| containing added sulphurous acid, not stamped, | 6 |
| containing added sulphur dioxide or compound thereof and not stated on package, | 2 |
| not stamped, | 2 |
| Beefsteak, diseased, decomposed and unwholesome, | 1 |
| Blackberries, Currants, Huckleberries, etc., filthy and contaminated, | 1 |
| Bread, Cakes, etc., exposed in such manner as to render them contaminated and unwholesome, | 1 |
| Breakfast Bacon, diseased, contaminated with worms, decomposed and unwholesome, | 1 |
| Breakfast Food, containing bugs and worms, | 1 |
| containing worms and weevils, | 2 |
| Butter, containing an excessive amount of moisture, | 3 |
| in an unwholesome and poisonous condition, | 1 |
| Cake, colored, | 1 |
| Candy, containing paraffin, | 3 |
| containing undeclared sulphites, | 2 |
| Bananas, containing sulphites, | 1 |
| Fudge, containing sulphites, | 1 |
| Marshmallows, containing sulphites, | 1 |
| Prize Boxes, containing sulphites, | 1 |
| Short Cake, containing sulphites, | 1 |
| Zig Zags, containing sulphites, | 1 |

## CASES TERMINATED—Continued

| | |
|---|---|
| Candied Cherries, containing sulphur dioxide, | 2 |
| Fruit, containing sulphur dioxide, | 2 |
| Catsup, adulterated, | 3 |
| containing an excessive amount of benzoic acid, | 2 |
| containing an excessive amount of sodium benzoate, | 17 |
| containing saccharin, | 2 |
| Cherries, containing sulphur dioxide and benzoic acid, | 1 |
| Chestnuts, unfit for food, | 1 |
| filthy and decomposed, | 1 |
| filthy, decomposed and unwholesome, | 2 |
| Chicken, unfit for food, | 1 |
| Chocolate Balls, containing no chocolate, | 1 |
| Bon Bons, adulterated, | 1 |
| Creams Imitation, containing cornstarch and coal tar dye, | 1 |
| Lu Lu Bars Imitation, containing resinous glaze, | 1 |
| Mints, containing no chocolate and colored with a coal tar dye, | 1 |
| Cider, containing undeclared benzoic acid, | 2 |
| Sweet, containing undeclared benzoic acid, | 1 |
| Cocoanut, decayed, | 2 |
| Caramels, adulterated, | 1 |
| containing large amount of foreign starch; | 1 |
| Marshmallow Candy, containing sulphites, | 1 |
| Coffee, adulterated, | 1 |
| containing chiccory and cereal, | 2 |
| containing ground roasted peas, | 1 |
| Confectionery, adulterated, | 1 |
| Corn Meal, sour and unfit for food, | 1 |
| Syrup, Apple and Sugar Butter, | 1 |
| Cottonseed Oil as and for Olive Oil, | 2 |
| Cream Fudge, coated with a resinous glaze, | 1 |
| Cream Nuts, filthy, decomposed and unwholesome, | 1 |
| Cream Puffs, adulterated, | 3 |
| Cucumber, partly decomposed, diseased and unfit for food, | 1 |
| Duck, decomposed, | 1 |
| Eggs, as and for fresh eggs, misbranded, | 3 |
| English Walnuts, unfit for food, | 1 |
| Figs in Maraschino, containing benzoic acid, | 1 |
| Flesh, unwholesome, | 1 |
| Flour, containing added nitrous acid, | 7 |
| Food, adulterated, | 1 |
| Fruit, decayed, | 1 |
| keeping in an unwholesome and filthy condition, | 3 |
| Fudge, coated with a resinous glaze, | 2 |
| Gelatine, containing sulphites, | 2 |
| Ice Cream Cones (empty) containing boric acid, | 1 |
| India Relish, containing saccharin, | 1 |
| Jelly, adulterated, | 1 |
| Ketchup, containing an excessive amount of benzoic acid, | 1 |
| containing an excessive amount of sodium benzoate, | 2 |
| Lemon Extract, adulterated, | 1 |
| Maintaining an unsanitary store, | 1 |

## CASES TERMINATED—Continued

| | |
|---|---|
| Maraschino Cherries, containing benzoate of soda, not declared, | 1 |
| containing sulphur dioxide or compound thereof, | 1 |
| Marasquin Cherries, containing sulphurous acid. | 1 |
| Marshmallow Candy, containing sulphites, | 1 |
| Meat, contaminated by flies, | 1 |
| bad, | 1 |
| exposing in such manner as to render them contaminated and unwholesome, | 1 |
| tubercular, unfit for food, | 2 |
| unwholesome, | 2 |
| Mince Meat, containing benzoic acid, not declared, | 1 |
| Nuts, decayed, | 1 |
| filthy and decayed, | 1 |
| Olive Oil, adulterated, | 1 |
| adulterated with cottonseed oil, | 3 |
| Imitation, made from cottonseed oil, | 1 |
| Oranges, containing coal oil, | 1 |
| rotten, | 1 |
| Oysters, containing added water, | 4 |
| Peas, Canned, colored with sulphate of copper, | 1 |
| unfit for food, | 1 |
| Peaches, Dried, adulterated, | 1 |
| decomposed and unfit for food, | 2 |
| Dried, bleached with sulphur dioxide, | 3 |
| containing undeclared sulphur dioxide. | 20 |
| containing sulphurous acid, | 1 |
| undeclared sulphurous acid, | 4 |
| containing undeclared sulphites, | 29 |
| Pies, Cakes, etc., exposed in a way and manner so as to render them unfit for food, | 1 |
| Pork Sausage, decayed, | 2 |
| Potatoes, rotten, | 1 |
| Prunes, containing undeclared sulphites, | 1 |
| Raisins, containing undeclared sulphites, | 10 |
| Sultana, containing undeclared sulphur dioxide, | 2 |
| Sausage, decayed, | 4 |
| putrid, | 1 |
| Strawberry Extract, adulterated, | 2 |
| Tomato Catsup, adulterated, | 3 |
| containing benzoic acid, | 1 |
| containing an excessive amount of sodium benzoate, | 33 |
| made from decomposed materials, | 3 |
| made from decomposed materials and contained saccharin, | 1 |
| made from decomposed materials and contained an excessive amount of sodium benzoate, | 3 |
| containing saccharin, | 6 |
| unfit for food, | 1 |

## CASES TERMINATED—Continued

| | |
|---|---|
| Vanilla Extract, adulterated, | 1 |
| Veal, bad, | 2 |
| | 328 |

### FRUIT SYRUP ACT, 1905, IN VIOLATION OF

| | |
|---|---|
| Strawberry Syrup, containing saccharin, | 15 |
| | 15 |

### ICE CREAM ACT, 1909, IN VIOLATION OF

| | |
|---|---|
| Ice Cream, below standard, | 9 |
| low in fat, | 5 |
| Caramel, low in fat, | 1 |
| Chocolate, below standard, | 1 |
| low in fat, | 9 |
| Strawberry, low in fat, | 2 |
| Vanilla, below standard, | 7 |
| low in fat, | 14 |
| | 48 |

### LARD ACT, 1909, IN VIOLATION OF

| | |
|---|---|
| Lard, adulterated, | 2 |
| containing beef stearin, | 1 |
| composed largely of cottonseed oil and beef fat, | 2 |
| compound, and not branded according to law, | 1 |
| | 6 |

### MEAT ACT, 1905, IN VIOLATION OF

| | |
|---|---|
| Hamburg Steak, containing sulphurous acid, | 3 |
| containing sulphites, | 1 |
| | 4 |

### MILK ACT, 1901, IN VIOLATION OF

| | |
|---|---|
| Milk, preserved with formaldehyde, | 5 |
| containing boracic acid, | 1 |
| | 6 |

### MILK ACT, 1911, IN VIOLATION OF

| | |
|---|---|
| Cream, low in fat, | 88 |
| Milk, low in fat, | 46 |
| low in fat and partially skimmed, | 11 |
| low in fat and skimmed, | 19 |
| low in fat, skimmed and watered, | 3 |
| low in fat and watered, | 28 |
| low in solids, | 1 |
| low in solids and watered, | 5 |
| low in fat and solids, | 71 |
| low in fat and solids, skimmed, | 49 |
| low in fat and solids, watered, | 12 |

| | |
|---|---|
| skimmed, | 22 |
| watered, | 25 |
| watered and skimmed, | 1 |
| Skimmed Milk, watered, | 1 |
| | 382 |

NON-ALCOHOLIC DRINK ACT, 1909, IN VIOLATION OF

| | |
|---|---|
| Birch Beer, containing saccharin, | 9 |
| Birch Pop, containing saccharin, | 1 |
| Cream Soda, containing saccharin, | 1 |
| Dog Head Fruit Cidera's, containing no fruit; containing benzoic acid, coal tar color and six per cent. alcohol, | 1 |
| Ginger Ale, containing undeclared added capsicum, | 1 |
| Imitation Real Chocolate, | 1 |
| Strawberry Soda, | 1 |
| Lemon Pop, containing saccharin, | 2 |
| Marrow Food, containing saccharin, | 1 |
| Orange Cider, containing saccharin, | 1 |
| Pop, containing saccharin, | 1 |
| Pop artificially colored and flavored, | 1 |
| Phosphate, containing saccharin, | 1 |
| Pop, containing saccharin, | 3 |
| Raspberry Pop, containing saccharin, | 1 |
| Red Pop, containing saccharin, | 1 |
| Root Beer, containing saccharin, | 3 |
| Sarsaparilla, containing saccharin, | 1 |
| Soda, containing saccharin, | 19 |
| Soft Drinks, adulterated, | 1 |
| containing saccharin, | 5 |
| misbranded, | 6 |
| Strawberry Pop, artificially colored, | 1 |
| artificially colored and flavored, | 3 |
| containing no strawberry and containing saccharin, | 2 |
| containing saccharin, | 4 |
| misbranded, | 2 |
| Soda, containing saccharin, | 26 |
| Sweet Cider, containing alcohol, | 1 |
| Temperance Brew, adulterated, | 2 |
| White Pop, containing saccharin, | 1 |
| | 104 |

OLEOMARGARINE ACT, 1901, IN VIOLATION OF

| | |
|---|---|
| Oleomargarine, colored in imitation of yellow butter, | 25 |
| without a license, | 19 |
| as and for butter and no license, | 7 |
| for butter with meals, | 1 |
| for butter with meals and no license, | 4 |
| for butter with meals and no license and no signs, | 2 |
| | 58 |

## CASES TERMINATED—Continued

RENOVATED BUTTER ACT, 1901, IN VIOLATION OF

| | |
|---|---|
| Renovated Butter, not marked and no license, | 1 |
| | 1 |

SAUSAGE ACT, 1911, IN VIOLATION OF

| | |
|---|---|
| Beef Bologna, containing vegetable flour, | 2 |
| Bologna Sausage, colored and containing cereals and added water, | 4 |
| containing vegetable flour, | 2 |
| Frankfurter Sausage, containing vegetable flour, | 1 |
| German Style Sausage, containing vegetable flour and added water, | 1 |
| Hamburg Steak, containing sulphites, | 1 |
| Luncheon Sausage, containing vegetable flour and added water, | 1 |
| Polish Sausage, containing vegetable flour, | 3 |
| Pork Sausage, containing sulphurous acid, | 1 |
| Sausage, adulterated, | 1 |
| containing vegetable flour, | 1 |
| containing vegetable flour and added water, | 1 |
| Canned, containing added cereal, | 1 |
| Smoked, containing vegetable flour and added water, | 1 |
| Vienna Style Sausage, containing vegetable flour and added water, | 6 |
| | 27 |

VINEGAR ACT, 1901, IN VIOLATION OF

| | |
|---|---|
| Apple Vinegar, not made wholly from apples and containing added water, | 1 |
| Cider Vinegar, adulterated, | 15 |
| containing added water, | 9 |
| a distilled vinegar, colored, | 1 |
| Imitation, | 1 |
| Distilled Vinegar, below standard, | 1 |
| for pure cider vinegar, | 6 |
| colored, | 1 |
| Vinegar, containing added water, | 3 |
| | 38 |
| Grand total, | 1049 |

## FINANCIAL STATEMENT

### RECEIPTS AND EXPENDITURES OF THE DAIRY AND FOOD BUREAU FOR THE YEAR 1912.

### RECEIPTS

| | |
|---|---|
| Covering oleomargarine license fees, renovated butter license fees, pure food, milk, renovated butter, vinegar, oleomargarine, cheese, egg, meat, non-alcoholic drink, sausage, ice cream, lard and fruit syrup fines, | $136,125 49 |

## EXPENDITURES

Covering special agents' salaries and expenses, chemists and laboratory salaries and expenses, attorneys, detectives and assistants' salaries, fees and expenses, and clerical and stenographers' salaries, ................ $82,049 65

## IN THE SUPERIOR COURT OF PENNSYLVANIA

Commonwealth of Pennsylvania
*vs.*
Harris A. Clewell.

No. 145 October Term 1911. Appeal by defendant from the judgment of the Court of Quarter Sessions of Northampton County.

Filed March 1, 1912.
Henderson, J.

The defendant was convicted on an indictment charging him with selling oleomargarine which was not "made and kept free from all coloration and ingredients causing it to look like yellow butter" in violation of the Act of May 29, 1901, P. L. 327. The question involved is thus stated: "Whether the Act of Assembly of 1901, May 29, P. L. 327, Section 1, prohibiting the sale, manufacture, etc., of oleomargarine 'which shall be in imitation of yellow butter produced from pure, unadulterated milk or cream of the same, with or without coloring matter,' means any shade or tint of yellow, and not what is commercially known as yellow butter. In other words is yellow butter in the Act synonymous with any shade of butter yellow? In the argument of the appellants counsel the statement is made that the only issue is, whether the oleomargarine sold by the defendant contained coloring matter or ingredients causing it to look like yellow butter produced from pure, unadulterated milk, or cream of the same, with or without coloring matter. The position taken by the appellant is "that the yellow butter named in the Act has reference to a certain standard of yellow butter which is the natural butter made in the month of June and which assumes a rich yellow color, but that natural butter made at any other time of the year falls below this standard of color." It is also contended that butter made at other times in the year than the month of June is generally artificially colored to resemble butter made in the month of June and that, therefore, butter so colored becomes a standard of the yellow butter to which the Act of Assembly refers and that the defendant should have been permitted to offer in evidence a sample of artificially colored butter for the purpose of showing that the oleomargarine which he sold was not of that color. The issue thus presented is within narrow compass. The position of the defendant asks us to declare that when the Legislature speaks of "yellow butter" it means butter having the color of that product made in the month of June, but we are unable to find either in the words of the Statute or from a consideration of the reasons leading to its enactment any warrant for such construction. As has been repeatedly stated the principal object of the Act was to prevent deception by dealers in oleomargarine and it would be a remarkable inference that care was only exercised toward the safeguarding of the public against imposition as to butter made during one-twelfth of the year. Witnesses are not necessary to show that butter is not all of the same color whether made in the month of June or at any other time. Different shades of yellow appear in its production contingent on the breed of cows, the feed used, the time of year in which it is made and the process of manufacture, and when the phrase "yellow butter" is used we think the Legislature intended to describe the general color inhering in that product. Any other construction would open every market to the sale of oleomargarine made in imitation of butter and no prohibition would exist except as to the imitation of the highest natural color of butter or of butter colored in imitation of it. This would defeat the very purpose of the Act. It is our duty to give it a reasonable construction and to enforce it according to its spirit as well as its letter. If we should hold that the words "yellow butter" are equivalent to "commercial butter" as contended for by the appellant we would be deciding that the law forbids the sale of oleomargarine not made and kept free from all coloration or ingredients causing it to look like butter having the highest natural color of yellow or butter artificially colored in imitation of such highest natural color. This would be equivalent to re-enacting the statute and giving it an application and limitation which could not have been in legislative contemplation. The whole history of the legislation on this subject shows that what was aimed at is the prevention of fraud on the consumers by the sale to them of another substance as and for butter. It was recognized that oleomargarine when not artificially colored has a white or very light shade and that some butter because of the use of excessive heat in the making or some other cause might also be white or very light and that to make white butter a standard would be a practical prohibition of the manufacture of oleomorgarine at all. Hence, the qualifying word "yellow." But there was no attempt to fix an absolute shade of yellow nor intention to permit an imitation of all shades of butter except that which was colored to the highest degree of yellow which butter in its natural condition ever possesses. It was unimportant, therefore, to know what was recognized in the trade in New York or elsewhere as "yellow butter." It may be as stated by the learned counsel for the appellant that this is butter colored to imitate June butter and that the public taste at the large centers of trade demands this color, but a large part of the butter produced in the Commonwealth is consumed in the localities in which it is produced and is sold from farms and creameries to local customers. These consumers were within the view of the Legislature as well as dwellers in the largest cities and are entitled to the same protection. The yellow butter to which the Act refers is not that sold in New York or Philadelphia alone but that which is produced on the farms and in the factories as well and is sold in its natural color or with the addition of coloring matter to increase its yellowness. The offer of artificially colored butter to establish a standard of color would not have helped the defendant for the prohibition is against the imitation of yellow butter whether it be colored or not. If the Commonwealth could show that the oleomargarine sold was in imitation of yellow butter produced from pure unadulterated milk and cream without coloring matter the case would be made out and it was of no consequence that it was not like some sample of colored butter which the defendant proposed to bring into the case. As there was evidence clear and direct that the oleomargarine in question contained cottonseed oil and butter fat and in the opinion of the expert chemist palm-oil also, and that it possessed a distinct yellow butter color the case was necessarily one for the jury. The subject of the ninth assignment is a portion of the charge and contains instruction to the jury that the samples of oleomargarine and butter were to be sent out for the purpose of applying the testimony of the witnesses to the exhibits in the case and the Court said to the jury that they ought not to substitute their own judgment irrespective of what the witnesses said or their own comparisons

**of the samples for the sworn testimony which they had in the case. This part of the charge immediately followed a reference by the Court to exhibits numbers one, nine, and ten and the testimony of a chemist called by the defense who analyzed exhibits nine and ten and testified that they were pure butter containing no coloring matter. The instruction to the jury was not inappropriate therefore, as they were not experts competent to determine the composition of the exhibits nor to say whether they were oleomargarine or butter unaided by the testimony of the witnesses. The instruction was not harmful to the defendant.**

**The offer to introduce a sample of what was alleged to be yellow butter for the purpose of establishing a standard of comparison without offering to show that the proposed standard was in fact butter was clearly inadmissible and properly rejected by the Court. The offer to introduce a sample of artificially colored oleomargarine was irrelevant. There are doubtless various shades of color in oleomargarine. The jury would get no information from the sample offered which would be of benefit to them in determining whether the article sold by the defendant was like yellow butter. The Court permitted the defendant to offer butter produced from pure unadulterated milk and cream, and exhibit number nine which was shown to be uncolored June butter was put in evidence. Testimony was also admitted to show that the defendant's oleomargarine resembled white butter, and the issue was squarely made as to its likeness to yellow butter. Unless therefore the defendant can maintain his position that he may sell oleomargarine of all shades of butter color except the deepest shade of yellow exhibited in June butter he has no defense and this in our view of the statute is not a maintainable position.**

**The assignments of error are all over-ruled, the judgment is affirmed and the record remitted to the Court below to the end that the sentence be carried into execution.**

State of Pennsylvania,
Philadelphia County.

I, Alfred B. Allen, Deputy Prothonotary of the Superior Court of Pennsylvania, do hereby certify that the above and foregoing is a true copy of the Opinion in the above entitled cause, so full and entire as appears of Record in said Court.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court at Philadelphia, this 7th day of March, A. D. 1912.

SEAL. ALFRED B. ALLEN,
*Deputy Prothonotary.*

## IN THE SUPERIOR COURT OF PENNSYLVANIA

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|---|---|
| The Commonwealth of Pennsylvania<br>*vs.*<br>Alexander T. Ignatavig. | No. 136 October Term 1911. Appeal by defendant from the judgment of the Court of Quarter Sessions of Schuylkill County. |

Filed March 1, 1912.
Henderson, J.

The charge against the defendant was that he sold oleomargarine which was not made and kept free from all coloration or ingredients causing it to look like yellow butter, in violation of the Act of May 29, 1901, P. L. 327. The fact of the sale was not denied, but the defendant contends that evidence was improperly introduced and that the statute was not correctly interpreted by the trial judge in the charge to the jury. The Commonwealth offered as exhibits packages of oleomargarine alleged to have the color of yellow butter bought from the defendant and a package shown to have the natural color of oleomargarine. All of these samples were analyzed by a chemist in the service of the Pure Food Division of the Department of Agriculture, and were admitted as exhibits in the case to show the color of the product sold by the defendant and the color of oleomargarine as it might be and was made without coloration or ingredients causing it to look like yellow butter. A sample of butter was offered to show the color of butter made from the cream of cows without the addition of any substance to affect its color. Objection was made to the introduction of the package of white oleomargarine because the question was not then raised whether oleomargarine could be made without some likeness in color to butter and to the sample of butter offered because it was made in the spring when the color of butter is light and the sample was not therefore, a correct exhibit of the butter referred to in the Act of Assembly which the defendant contended was "June Butter" or "Commercial Butter." The first eight assignments of error relate to these samples and may be considered together. The sale of the oleomargarine being admitted the question for the consideration of the jury was whether the thing sold looked like yellow butter and while it was not necessary for the Commonwealth at that stage of the proceedings to show that oleomargarine was manufactured which did not have this likeness it was not erroneous to permit proof of that fact when offered by the Commonwealth in anticipation of testimony tending to show that a yellow color was an essential quality of oleomargarine. At a later stage of the trial the defendant offered evidence to show that a yellow tint was inseparable from that product when manufactured from the constituents essential to its production, and the relevancy of evidence as to this sample was thus established. We do not wish to be understood as deciding that a successful defense could be maintained on proof that oleomargarine is necessarily yellow, but that was one of the facts alleged and evidence was offered by the defense to that effect and this the Commonwealth might rebut. The sample was also admissible for the purpose of comparison by the jury between it and the packages bought from the defendant, one of which was shown to contain some butter and the other cottonseed oil, the presence of which would account, in part at least, for the color exhibited by the specimens. The offer of the package of butter was allowed to bring before the jury evidence of the natural color of butter and this evidence we regard as clearly admissible, if evidence were at all necessary to inform a jury of average intelligence what yellow butter looks like. The offer of the defendant to prove that a sample of butter obtained from Gimbel Brothers in Philadelphia was yellow butter was properly rejected. There was no offer to prove nor pretence that it was the natural product of cream and the jury would receive no light from the examination of such an exhibit. The yellow butter to which the Act applies is butter made from the milk of cows and the imitation prohibited is likeness to that product. It was not sufficient to show that the article was regarded by the witness as yellow butter and whether made from milk and whether artificially colored or not was not offered to be shown. One of the principal objects of the statute as was stated by President Judge Rice in Com. *v.* Mellet, 27 Pa. Super. Ct. 50, was "to prevent the sale of oleomargarine, which, by reason of the addition of coloring matter, or of the selection or treatment or combination of its component parts, is made to resemble and be in imitation of yellow butter." It was not the purpose to fix as a standard butter highly colored artificially nor something which may not have been in fact pure butter. The 14th, 15th, 16th and 17th assignments relate to evidence bearing on the meaning of the words "yellow butter" and the effort of the defendant to show what was known in the market as "yellow butter." The only market referred to was the Philadelphia market and the proposal was to show what the color "yellow" is as applied to commercial butter. These offers were overruled by the Court for the reason that the Act has reference to the color of butter that is made exclusively from milk or cream without the addition of any ingredient to give it any other color than its natural color—the color derived from the ingredients used to make what is known as unadulterated butter. Opportunity was given to prove the color of butter made at the time of trial or at any other time of year but the defense was limited to the natural color, not that produced by the addition of some ingredient for the purpose of producing color. In so ruling the Court was obviously in harmony with the spirit and purpose of the statute. It is within the power of the Legislature to wholly prohibit the sale of oleomargarine as was done by the Act of 1885 and if to prohibit, certainly to regulate. It may be that the regulation referred to embarrassed manufacturers of and dealers in this class of goods, but that is a legislative consideration. It was evidently the belief of the law-making body that this provision and others incorporated into the statute were necessary to prevent deception and it is not for the Court to hold that this was a mistaken conception. Evidence was in the case that natural butter has a color known as "butter yellow" and that it is yellow all the year around; that depth of color varies somewhat but that in the ordinary processes of manufacture it has a distinctive yellow color, and this is what the defendant's oleomargarine imitated. The Court submitted the case with instructions as favorable to the defendant as the facts would permit. Attention was called to the evidence that butter in May, June and July has a distinct yellow color known as yellow butter and that this is the color that the Legislature intended that oleomargarine should not possess—that is, the color of yellow butter. This we think limited the Commonwealth to proof of a higher degree of color than is required by the statute and to that extent was favorable to the defendant. We have considered the words "yellow butter" as used in the statute in Com. *v.* Clewell, decided at this term, and what was there said need not be now repeated. Our conclusion was that the prohibition of the statute applied to all butter made wholly from the milk of cows by the ordinary processes of manufacture having a yellow color although that color might vary in degree and whether the natural color or a color artificially produced in imitation of the natural color. The jurors saw the oleomargarine which the defendant sold; they saw a sample of white oleomargarine; they heard the testimony of one of the defendant's witnesses from whom he purchased the oleomargarine and they saw a sample of pure butter made about the time of the trial. They brought into exercise their own sense, as well, and on the evidence convicted the defendant

We do not find any reversible error in the proceeding and therefore affirm the judgment and remit the record to the Court below to the end that the sentence may be carried into effect.

## COMMONWEALTH *VS.* IGNATAVIG

State of Pennsylvania,
Philadelphia County.

I, Alfred B. Allen, Deputy Prothonotary of the Superior Court of Pennsylvania, do hereby certify that the above and foregoing is a true copy of the Opinion in the above entitled cause, so full and entire as appears of Record in said Court.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court at Philadelphia, this 7th day of March, A. D. 1912.

SEAL.

ALFRED B. ALLEN,
Deputy Prothonotary.

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## COMMONWEALTH *V.* PFLAUM, APPELLANT.

Constitutional law—Title of act—Classification—Discrimination—Food law—Confectionery—Act of May 13, 1909, P. L. 520.

1. The Act of May 13, 1909, P. L. 520, entitled "An act relating to food; defining food; providing for the protection of the public health," etc., is sufficiently comprehensive in the title to give notice of a prohibition against adding sulphur dioxide to confectionery, inasmuch as confectionery is a food.

2. The fact that the act provides that in the preparation of dried fruits and molasses, sulphur dioxide may be used in quantities not detrimental to health, does not render the act unconstitutional as violating Art. 3, Sec. 7, of the Constitution; nor is the act open to the objection of wrongful classification and discrimination because it relieves retail dealers from prosecution, where they sell under a guaranty signed by the manufacturer or a wholesale dealer.

3. A person may be convicted under the Act of 1909 of selling confectionery to which sulphur dioxide has been added, where it appears that the sulphur dioxide was added to gelatine in the bleaching process, and that the gelatine was then added to other constituents to compose the confectionery which the defendant sold.

Argued April 8, 1912, Appeal No. 148, Jan. T., 1912, by defendant, from judgment of Superior Court, Oct. T., 1911, No. 218, reversing judgment of Q. S. Phila. Co., March T., 1911, No. 747, arresting judgment on verdict of guilty in case of Commonwealth *v.* Christian Pflaum, Jr. Before Fell, C. J., Brown, Mestrezat, Stewart and Moschzisker, JJ. Affirmed.

Appeal from judgment of Superior Court.

Henderson, J., filed the following opinion:

The defendant was convicted on the first and second counts of an indictment which charged him with selling confectionery which contained sulphur dioxide, in violation of the Act of May 13, 1909, P. L. 520. This act is entitled "An Act relating to food; defining food; providing for the protection of the public health and the prevention of fraud and deception by prohibiting the manufacture or sale, the offering for sale or exposing for sale, or the having in possession with intent to sell of adulterated, misbranded or deleterious foods; prescribing certain duties for the Dairy and Food Commissioner in reference thereto; and providing penalties for the violation thereof." The indictment was drawn under the fifth paragraph of the third section of the act, which declares that any article of food shall be deemed to be adulterated: "FIFTH. If it contains any added sulphurous acid, sulphur dioxide or sulphites, benzoate acid or benzoates except as hereafter provided; or if it contains boric acid or borates, salicylic acid or salicylates, formaldehyde, hydrofluoric acid or fluorides, fluoborates, fluosilicates or other fluorine compounds, dulcin, glucin, saccharin, alum, compounds of copper, betanapthol, hydronapthol, abrastol, asaprol, oxides of nitrogen, nitrous acid or nitrates, pyroligenous acid, or other added ingredients deleterious to health; or if, in the case of confectionery, it contains any of the substances mentioned in this paragraph, or any mineral substance, or injurious color or flavor, alcoholic liquor, or any other ingredient, not herein mentioned, deleterious to health: — — — — — And provided further that in the preparation of dried fruits and molasses, sulphur dioxide, either free or in simple combination may be used in such quantities as will not render said dried fruits or molasses deleterious to health." On motion of the defendant the learned Judge of the Quarter Sessions arrested the judgment for the reason that the evidence did not show that sulphur dioxide had been "added" to the confections sold by the defendant, and from the opinion filed the learned judge seems to have entertained the view that the act was unconstitutional as applied to confectionery which did not contain "added" dioxide of sulphur or other adulterant. The first objection raised by the defendant was that the title to the act is defective in that confectionery is not specified as one of the subjects legislated about. This implies that confectionery is not food, and such is the contention of the appellee. The act not only relates to food, but the title indicates that the intention was to define what food is. That the Legislature may define the terms it uses and the meaning which it attaches to words cannot be doubted. Where the meaning given in the act is not that which attaches to them in the common understanding the title of an act should express any exceptional meaning with sufficient clearness to excite inquiry as to the provisions of the act, and this was evidently in the legislative mind when the title to the act was framed. Notice is given in the title of the intention to define the term "food." The title to the act to which Com. v. Kebort, 212 Pa. 289, related was different in form, and contained no notice of the definition of the term "food" set forth in the body of the statute. That case is not an authority, therefore, in support of the appellee's position, even if a definition of the word were necessary as applied to candy and other confectionery. It was held in Com. *v.* Kebort, that the term "food" did not include drink; that there was a generic distinction which had been recognized in the thought and speech of the race from time immemorial, and that the word "food" did not include in the popular understanding drink also, and that, therefore, liquors were not included in the prohibitions of the Act of June 26, 1895, P. L. 317. That the word "food" is a very general term, and applies to all that is eaten for the nourishment of the body cannot be questioned. It is so understood generally, and the authorities whose accuracy is relied upon in all departments of investigation concur in that definition. "Nutritive material absorbed or taken into the body for the purpose of growth or repair, or for the maintenance of the vital processes."—Webster. "That which is eaten or drunk for nourishment, aliment; nutriment, in the scientific sense. Any substance that, being taken into the body of an animal or plant, serves, through organic action, to build up normal structure or supply the waste of tissue; nutriment."—Standard Dictionary. "Whatever supplies nourishment to organic bodies; aliment; victuals, provisions."—Century Dictionary. "It seems not a debatable question whether confections are within these definitions. No one could contend that sugar and honey are not food, or that preserved fruits and chocolate are not nutriment, and these constitute the great bulk of the confectionery manufactured and sold. The enormous consumption of the materials which enter into the composition of confectionery and the value which they have in the economy of nutrition are so well known that it is not necessary to enter into a discussion of their scientific value, nor the relation they bear to the food supply of the human race. That the term "food" includes candy, sweetmeats, preserves and other confectionery, accords with the opinions of lexicographers, chemists, and the public understanding, but if this were not so, as the Legislature might include confections in the catalogue of foods, and has so done in this case, and has given notice in the title of the act that it contained a definition of the things to which the statute applied, all interested are put on inquiry as to matters therein contained, and a title which leads to inquiry is sufficient in this respect. We need not refer to the numerous cases which hold that it is not necessary that all the distinct provisions of a statute be set forth in the title, and that it is sufficient if that give notice of the subject of the act so as reasonably to lead to an inquiry as to what is contained in the body of the bill. Whatever the subject of a title reasonably suggests as appropriate to the accomplishment of the object declared is sufficiently indicated by such title. "Every possible presumption is in favor of the validity of a statute, and this continues until the contrary is shown beyond a rational doubt. One branch of the government cannot encroach on the domain of another without danger": Sinking Fund Cases, 99 U. S. 700; Powell *v.* Penna., 127 U. S. 678 (8 Superior Ct. Repr. 992, 1257); Sugar Notch Boro., 192 Pa. 349.

The statute under consideration is a police regulation. It has to do with the public health, which is one of the chief objects of government and a proper subject of legislative control. The power of the Legislature to promote the general welfare is extensive, and it may exercise a large discretion in determining how that power shall be employed. What the interests of the public require and what measures are necessary to protect them are subjects for the exercise of this discretion. Whether in a given instance the manufacture and sale of an article intended for human consumption is deleterious to health, and whether the public welfare demands that such business be prohibited, are questions of fact and policy exclusively for the determination of the Legislature. It is an elementary proposition that all property in this State is held under the implied obligation that the owner shall not use it to the injury of the community. The Legislature has declared that sulphur dioxide is deleterious to health, and has forbidden its use in the manufacture of confectionery. We must assume that this determination was reached after full examination and on reasonable grounds, and that in the judgment of a body having control of the subject, such prohibition was necessary to promote the public health.

It is contended, however, that the statute discriminates as to all other food except confectionery and in favor of dried fruits and molasses and that it violates the 7th Section, of Article 3, of the Constitution of Pennsylvania for that reason. Whether these distinctions have been incorporated in the statute was a legislative question. It was clearly within the power of the Legislature to prohibit the use of sulphur dioxide or any other poison in all of the articles entering into the food supply of the citizens of the Commonwealth and under the same power it might limit the prohibition to one class of food and not to another: Crowley *v.* Christensen, 137 U. S. 86 (11 Superior Ct. Repr. 13); Davis *v.* Mass., 167 U. S. 43 (17 Superior Ct. Repr. 731). It is not necessary in the exercise of the police power that legislation be directed against all subjects prejudicial to the public welfare. This statute might have operated only on confectionery or flour or sugar. At the same session of the Legislature separate acts were passed with reference to fresh eggs, lard, ice cream and milk and cream, and numerous other similar statutes were enacted at other sessions of the Legislature. The same discretion which permitted the enactment of a prohibitory law as to one article of food might exempt another from the prohibition. It is permissible to classify in such a case, reference being had to the character of the food, the form in which the adulterant is used and the extent to which the food is consumed. The Legislature had these considerations in mind doubtless in the case of dried fruits and molasses. We cannot declare judicially that sulphur dioxide in the limited quantities permitted in the case of these two articles would affect the public health. Certain it is that they are not used to the extent to which confectionery preparations are used. No constitutional obligation rests on the Legislature to subject every article of food to the same regulation. It is easy to conjecture reasons which may have led the Legislature to place dried fruits and molasses in the same category and it is our duty to assume that such consideration influenced that body. The fact, too, that it was provided that where sulphur dioxide in quantities not deleterious to health was used in the preparation of dried fruits and molasses notice that it had been so used must be plainly stated on each package suggests that the Legislature recognized that sales of these articles are generally made to adults or persons able to understand that notice which the package must contain, whereas a very large proportion of the confectionery made in the country is sold to children who consume it without knowledge or discretion as to its constituents. And these considerations apply as well to the objection that the presence of sulphur dioxide in confectionery is forbidden, whereas in the case of the other foods the adding of that substance is only prohibited. What the legislative thought was in making this distinction is not expressed but it is not difficult to see that it is based on substantial grounds. The evidence shows that gelatine is largely used in the manufacture of confectionery and that in the preparation of it large quantities of sulphur dioxide are used; that in much of the gelatine this chemical is not removed but remains in it when distributed by the manufacturers for consumption. This is doubtless the result of carelessness or cupidity and a condition difficult to guard against on the part of the health authorities. It is not shown that sulphur dioxide enters in any appreciable degree into the natural composition of other foods. It may have been as the result of accurate knowledge on the subject that added sulphur dioxide was prohibited in the one case and whether "added" or not, in the other.

Objection is made to the enforcement of the statute because of that part of Section five which provides:

"But no prosecution shall be sustained, under the provisions of this act, against a retail dealer for the selling, offering for sale, exposing for sale, or having in possession with intent to sell, or any adulterated or misbranded article of food as defined herein, if the retail dealer from whom the said article of food, sample, or portion thereof, was obtained by the Dairy and Food Commissioner or his agent, can establish a guaranty, signed by the manufacturer or wholesale dealer, or jobber or distributor, residing in the United States, from whom such article of food was purchased or procured, to the effect that the same is not adulterated or misbranded, within the meaning of this act designating it." This is said to be classification and discrimination. It will be observed, however, that, it is not discrimination in favor of the sale of the adulterated products. The prohibition of them is general. It applies to all classes of dealers and declares the use of the poisonous ingredient to be unlawful. The reason for this exemption from prosecution is apparent. The transactions of manufacturers and wholesale dealers are with large quantities and they have an opportunity to know the composition of their merchandise. The retail dealer who buys his stock in small quantities is in a very different situation. He has neither knowledge nor means of knowledge of the ingredients composing the article which he buys. He must rely in the first instance on the honesty of the wholesale dealer. Where he has a guaranty from such dealer as to the purity of the goods purchased there is a reason for protecting him from the penalty of a sale without notice of the character of the commodity. The classification between wholesale and retail dealers is a very obvious one and has been sustained in numerous cases. The Act of April 22, 1846, P. L. 486, relating to tax on dealers in merchandise distinguished between those who sold goods of their own manufacture at their manufactories and those who sold other wares than those of their own manufacture. This Act was considered in Norris *v.* Com., 27 Pa. 494. The Act of May 2, 1899, P. L. 184, classified dealers into four classes and it was sustained in Knisely v. Cotteral, 196 Pa., 614, where the Court said: "The division of vendors into wholesale and retail is perhaps the most obvious and familiar that could be made." "Classification is a legislative question subject to judicial revision only so far as to see that it is founded on real distinctions in the subjects classified, and not on artificial or irrelevant ones:" Seabolt *v.* Commissioners, 187 Pa. 318. This case involved the construction of the Act of May 6, 1897, P. L. 46, classifying public bridges. The classification of telegraph companies was held valid in Western Union Tel Co. *v.* Milling Co., 218 U. S. 406. Distinction between jobbers and wholesale dealers in cigarettes and between wholesale and retail dealers in leaf tobacco and liquors was sustained in Cook *v.* Marshall Co., 196 U. S. 261 (25 Sup. Ct. Repr. 233). The same principle was applied in S. W. Oil Co. *v.* Texas, 217 U. S. 114 (30 Sup. Ct. Repr. 496), under a statute which provided for penalties for violation thereof. There is substantial ground, therefore, for the distinction made between wholesale and retail dealers as to the imposition of the penalty provided by the statute.

The fact is not to be overlooked, however, that the defendant is a wholesale dealer and as to that class of merchandise the act is complete. The exception as to dried fruits and molasses and the exemption of retail dealers who sold ignorantly on a guaranty did not affect him. The broad terms of the act declare it to be unlawful to sell confectionery containing the prohibited adulteration. The Legislature having power as we have seen to enact this prohibition the defendant is not relieved by the consideration that some other article of merchandise is not in the same class or that retail dealers who sell on the representation of the wholesale dealer as to the purity of the goods are not to be visited with the penalties of the act for the first offense. The exceptions referred to are not of such import that without them the other sections of the act would cause results not contemplated or declared by the Legislature: New York, ex rel. Hatch *v.* Reardon, 204 U. S. 152 (27 Sup. Ct. Repr. 188); Connolly *v.* Sewer Pipe Co., 184 U. S. 540 (22 Sup. Ct. Repr. 431). As affecting this case it is not important whether the sulphur dioxide was "added" to the candy as a separate constituent or was there because it was in one of the ingredients entering into the composition of the confectionery for under the first count of the indictment, as we have seen, a sale of the merchandise containing this ingredient is prohibited whether it be separately added or not and the conviction could be sustained on that count. We think that the evidence warranted the submission of the case to the jury on the second count. It shows that sulphur dioxide is not a natural content of any of the materials used in the manufacture of the confectionery. There was evidence, however, that traces of sulphur dioxide may appear in some natural food products because of sulphur existing therein which may account for such traces. This could be considered as having a natural origin and if it existed would not be "added" within the meaning of the Act. It may be that minute quantities of other prohibited substances are naturally developed in other foods but this is not the condition to which the statute has reference. The purpose is clear. No one is permited to take sulphur dioxide and add it to a completed product or to put it into one constituent of a product and in combination with others make an article of food, with the exception of dried fruits and molasses. It is not disputed that sulphur dioxide may be combined with gelatine in the bleaching process and that is shown to be the manner in which it found its way into the goods of the defendant. It was added to the gelatine and the gelatine was combined with sugar and other constituents to compose the candy which the defendant sold. It would be too narrow a consideration of the act to hold that a prohibited element introduced into a manufactured product in the manner described by the Commonwealth's witness was not added. It is not necessary for the Commonwealth to show that the defendant knew that his merchandise contained the prohibited substance: Com. *v.* Farren, 91 Mass. 489; Powell *v.* Com., 114 Pa. 265. It may be as contended by the learned counsel for the appellee that the law bears heavily on a person so situated but that is a result of the exercise of the police power in very many instances. From the necessity of the case special burdens are often borne for the general benefit. Regulations promoting the public welfare may press with greater weight on one than upon another but the purpose is not to impose unequal or unnecessary restrictions upon one but to promote the general good: Barbier *v.* Connolly, 113 U. S. 27 (5 Sup. Ct. Repr. 357); Fischer *v.* St. Louis, 194 U. S. 361 (24 Sup. Ct. Repr. 673). It is not a relevant matter that in the opinion of the defendant or his witnesses the confections which he sold were wholesome and not deleterious to health. The quality of the particular merchandise does not affect the constitutionality of the act. Its object is the promotion of the public health by the method deemed best by the Legislature. To decide that because some of the products affected by the statute were wholesome the law could not be enforced would undermine the police power of the State and overthrow every statute the wisdom of which would not bear judicial scrutiny: Powell *v.* Com., 114 Pa. 265; Powell *v.* Penn., 127 U. S. 678 (8 Sup. Ct. Repr. 992, 1257). No one pretends that sulphur dioxide is necessary or desirable in confectionery. The most that can be said is that in very small quantities it is not shown to be prejudicial. No one has a natural or a constitutional right to put poison in confectionery or other foods and the beneficial object of the statute under consideration ought not to be defeated except by clearly convincing reasons.

We are not persuaded that any of the objections presented are sufficient to justify the conclusion that the act is unconstitutional.

The judgment is reversed and the record remitted to the Court below to the end that sentence be imposed on the verdict in accordance with the law.

Error assigned was the judgment of the Superior Court.

Frank P. Prichard, with him Thomas E. Lannen, for appellant.

Wm. M. Hargest, Assistant Deputy Attorney General, with him Samuel B. Rotan, District Attorney, and E. C. Rhoades and John C. Bell, Attorney General, for appellee.

PER CURIAM, APRIL 29, 1912:

In the opinion of a majority of this court the judgment appealed from should be affirmed for the reasons stated in the opinion of the Superior Court.

Judgment affirmed.

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## THE TURNING OVER OF SAMPLES

An important opinion of Bell, J., Blair county, in the case Commonwealth *vs.* J. A. Koller, *et al,* in re. rule to show cause why portions of samples taken by the Commonwealth should not be turned over to defendants for analysis.

## IN THE COURT OF QUARTER SESSIONS OF BLAIR COUNTY

Commonwealth
*vs.*
J. A. Koller et al.
October Sessions, 1904.

In re. rule to show cause why Commonwealth should not place in the hands of defendants a portion of sample for analysis by defendants, and for a bill of particulars.

Argument of Mr. Woodward, counsel for Commonwealth.

I think it will be conceded that the proposition as made on the part of the defense in this case is entirely novel. I listened with a great deal of interest to the argument on the part of defendant to discover any precedent for an application of this kind, and fail to find that counsel, with all his diligence, has produced any authorities to justify them in making such an order. This application is two fold; but the two different features are very closely related. In the first place it is that the Commonwealth be compelled by the court to place in the hands of the defendant here, charged with a crime, the evidence now in the possession of the Commonwealth, and to place in their hands the samples of food products which have been taken, and which are supposed to be in the possession of the Commonwealth, whether they are or not does not appear in the case. A bill of particulars is the second application. We have to say in reference to the bill of particulars that the application is entirely novel in this respect; a bill of particulars in Pennsylvania, under our criminal law, can never be required in advance of an indictment. The indictment is the bill of particulars. By reason of the generality of the informations, and that arises by reason of the fact that informations are very frequently drawn by persons unskilled, the law requires before any man shall be placed on trial that there shall be a specification of the matter set forth in the form of an indictment which is in itself a bill of particulars. Now it is a little novel in advance of an indictment that defendant could come into court merely on an information that he had been arrested, and there was no issue before the court, and ask for a bill of particulars. The indictment corresponds with the declaration in a civil suit, and until an indictment is found, just as in a civil suit until declaration is filed, defendant is not in jeopardy and cannot be called upon to plead, and can at that time object to the information, unless the information upon its face fails to disclose a crime. All that is necessary is to show that a crime has been committed. There is no allegation in this case that the indictment is not in the usual form, or that it does not specify any crime to have been committed, or does not come within the act of Assembly as well as within our precedents in reference to form of indictments. Nor is there any reason that by reasons of generality that the defendant is liable to be surprised by reason of the evidence of the Commonwealth.

We come to the second proposition: that the Commonwealth be compelled to furnish a sample, or portion of the sample in their possession, that a part of the evidence, the property of the Commonwealth, be placed in the hands of men here charged with a crime. We say this is an unheard of proposition in Pennsylvania. A parallel case would be if they would come in in a criminal court and ask the Commonwealth to furnish the defendant with a list of her witnesses, with the right to examine these witnesses before the court, or to specify in advance of the trial of the case exactly what evidence was to be produced. We say in the first place that a bill of particulars such as this would be is not a matter of right; it is a question that appeals to the discretion of the court entirely, and it will only be granted in such cases where defendants' rights are liable to be jeopardized by reason of the generality of the charge, that they shall furnish specifications in relation to this crime. They are not entitled to it in Pennsylvania, and there is no decision that will give them that kind of authority. We have some decisions on the general proposition. The first on the question of bill of particulars is Commonwealth *v.* Powell, 23 Sup. Ct. 370, &c., (reading same). I refer to the case of Commonwealth *v.* Buccieri, 153 Pa. 535 (and reads from same). We also refer to the case of Commonwealth *v.* Applegate, 1 District Reports 127 (reciting facts, &c.).

We had an application somewhat similar to this in Centre County for a bill of particulars, and upon this same question it was refused in an opinion which I have here.

Counsel has cited a case here from the civil courts in reference to the examination of people who are alleged to have suffered from some accident, and cites that as a parallel case. That is not a parallel case for this reason: while the court may in the exercise of its discretion compel the plaintiff seeking damages after an accident that may occur to him, while he may compel the defendant in court, and in the presence of the other side, with their expert witnesses present, that is the only rule I know of adopted in the Commonwealth of Pennsylvania, to submit himself to an examination; yet I think he will not find a case in which the plaintiff is compelled in advance of court, out of court, and away from his own parties and his own physician to submit himself to an examination. Now this application is not made to compel the examination in the presence of the experts on one side and the other, but the application is that the defendant is to have this sample handed over wholesale to the defendant, and we say this is without merit, and the Commonwealth is not bound to do it.

## IN THE COURT OF QUARTER SESSIONS OF BLAIR COUNTY

Commonwealth
*vs.*
J. A. Koller, et al.

In re. rule to show cause why portions of samples taken by the Commonwealth should not be turned over to defendants for analysis.

BY THE COURT: "So far as the rule for a bill of particulars is concerned, as ruled by the Supreme Court in Commonwealth *vs.* Powell, 23 Sup. Ct. 372, a bill of particulars in a criminal case is not a matter of right, but is only an appeal to the sound discretion of the Court. My recollection is, that in some of the pure food indictments in cases tried in this court there was simply an allegation in the indictment that the Pure Food Act had been violated, without specifying the particular violation. I am inclined to think that that indictment was perfectly good. We have our Act of Assembly which provides that an indictment shall be deemed sufficient which simply follows the words of the Act of Assembly, and if this indictment had simply followed the words of the Act of Assembly, and been in the general form with which we found other indictments we would feel it but right and proper that the Commonwealth should specify the particular article of food which was supposed to be adulterated, and at least specify in a general way how that particular article of food was adulterated; but in the present instance the particular article of food is specified, to-wit: CHOCOLATE, and there is a general statement as to how it is adulterated. I think we will all agree on a moment's reflection that the rulings of the appellate courts on this subject are perfectly right and proper. The authority cited by Mr. Baldridge is not an analogous authority at all. In the first place, as stated by Mr. Woodward, the physical examination to which the plaintiff is compelled to subject himself is always made—and I am speaking only as to the orders of—is always in the presence of the physician of the plaintiff. I have drawn frequent orders compelling plaintiffs in damage cases to submit to physical examinations, but I was always careful to provide that the physician of the plaintiff should be present so that no unfair advantage could be taken of the plaintiff, and that everything that was done there was done in the presence of the physician of the plaintiff. But it seems to me that the endeavor to liken a civil proceeding to a criminal proceeding is fallacious, and there is the vice of the offer. In a civil proceeding the plaintiff may be compelled to subject himself to a physical examination. At the same time he has the mutual and co-ordinate right of compelling defendant to disclose his case. Not so in a criminal case. The defendant can hold all the papers in his possession, and there is no power to compel him to produce them. He can sit on the witness stand and say I have a paper at home, and the court is powerless to make him produce evidence to establish his guilt. That is one reason. In the second place a civil suit is tried on the weight of the evidence. Each party comes in with an equal right to be heard as to the measure of proof, but in a criminal suit the burden is on the Commonwealth to establish the case beyond a reasonable doubt and these maxims of ours about the reasonable doubt that the jury must come to the firm unwavering conviction that the defendant is guilty, have come down to us from times when judges were wont to hang a man for the stealing of a loaf of bread. Now I do not say in the present criminal procedure that we should get away from those old maxims, but I do say that while we adhere to these old maxims, which were adopted when they hung men for stealing a loaf of bread, such maxims ought not to be applied against the Commonwealth on the one side and then on the other hand the Commonwealth be compelled to disclose all their case, and the absence of precedent to my mind is strong proof that there is no warrant for a court compelling the Commonwealth to submit their evidence in advance to the defendant. It does seem to me that the able criminal, lawyers who have defended criminals charged with grave offenses if there was any warrant for such a precedent would have brought it in force. Take for instance a murder case. The Commonwealth claim that they found on the prisoner a bloody shirt, and that the blood stains are human blood, not chicken blood, or blood which he received butchering a hog, but human blood; now we all know that the experts on the part of the defense coach the lawyers for the defense while they cross-examine the experts of the Commonwealth, but I do not think there would be any warrant for a defendant charged with murder to say you must tear that shirt in two and you must give my chemist one-half of the alleged blood stains so that they can prepare a defense; or, to put it more mildly, that they can have the alleged blood stains analyzed. I do not know of any such precedent, and the very fact that Mr. Baldridge, after diligent search, has been unable to find one, to my mind, is proof that there is no warrant to force the Commonwealth to produce the evidence they are going to submit. As I said before, in a civil suit, under certain equitable rules, each side must apprise the other side of what evidence they are going to use, but I do not think it would be fair to say to the Commonwealth you must give the defendant all your side of the case so that he can examine and ransack it, and at the same time allow the defendant to keep his mouth shut. It seems to me that would be giving a defendant an unfair advantage, and it seems to me it would be unfair to compel the Commonwealth to allow a defendant to subject their samples to examination in advance, and I will overrule the application for the compelling of the production of such samples. As to experiments in open court, I do not know to what extent I will go about a matter of that kind. I did rule in the formaldehyde cases, where Mr. Hicks wanted to take a drink of the preservative, and wanted the Court to take a drink of it, and let the jury take a drink of it, I did rule that he could take a drink of it, but the Court would not, and would not have the jury do so. Mr. Hicks was going to turn the court into a laboratory and I think we said we would not have any laboratory here in court. I do not know to what extent I would go if there was an effort on the part of the defendant to examine samples by microscopic tests—I will leave that matter open."

I hereby certify that the foregoing is a correct transcript of the opinion of the court in the case of Commonwealth *vs.* J. A. Koller, et al, in re. rule for turning over portion of sample taken by Commonwealth.

J. F. MECK,  
*Official Stenographer,*  
Courts of Blair County.

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Clearfield, Pa., Sept. 21st, 1911.

Honorable James Foust,  
Dairy and Food Commissioner,  
Harrisburg, Pa.

Sir:—I am in receipt of your favor of the 19th inst., enclosing letter to you from Robert Crane, Esquire, of Philadelphia, Pa. Mr. Crane's letter is as follows:

Philadelphia, Pa., Sept. 19, 1911.

"James A. Foust,  
Food Commissioner,  
Harrisburg, Pa.

Dear Sir:—Will you kindly ask your attorneys if I understand the second section of the endorsed ice cream Act No. 38 to mean that I can use a harmless coloring matter in ice cream when the right amount or sufficient fruit is used for flavor.

Very truly yours,  
"ROBERT CRANE."

In accordance with the request of Mr. Crane you have referred to me his inquiry and request my opinion as to the construction and meaning of that part of Section 2 of the Act of 24th of March, 1909, that refers to the use of coloring matter.

The Act of Assembly under consideration is one of our Food Laws and like all Food Laws is has two primary purposes in its enactment. These are, first: For the protection of the public health and second: For the prevention of fraud and deception in the manufacture and sale of food. These purposes are declared by the Legislature in the title of this Act and in the title of most of our food acts. The purposes here declared permeate every part of the Act and determine in some measure the interpretation thereof. These purposes make the declaratory parts of the Act beneficial and require, therefore, in those parts of the Act, a liberal construction, such as will fully and effectually accomplish the purposes of the Legislature. It is well known that an Act of Assembly may be at the same time beneficial and penal or rather in part beneficial and in part penal; and our Appellate Courts have recognized the principle that such Acts are to be construed liberally as to the beneficial part and strictly as to the penal.

Section 2 of the Act in question is the section that deals with the definition of adulteration and the part of said Section for construction read in connection with the first Clause of said section is as follows:—"Ice cream shall be deemed adulterated within the meaning of the Act * * * * * If it shall contain salts of copper, iron oxide ochres or any coloring substance deleterious to health: Provided, that this paragraph shall not be construed to prohibit the use of harmless coloring matter in ice cream, when not used for fraudulent purposes."

This paragraph expressly prohibits by name two coloring substances, viz: salts of copper and iron oxide ochres. It further prohibits all coloring substances deleterious to health.

It then permits all harmless coloring matter when not used for fraudulent purposes. It is apparent that in naming specifically two coloring substances it was in the mind of the Legislature that it was clear that these two at least were not to be permitted, because they are either injurious or else their use would be fraudulent. Their status as colors was in the Legislative mind, fixed and certain; hence the prohibition of then by name. The kinds of colors which are deleterious to health is not determined in the Act; that is left to the determination of the Courts; but they are prohibited as a class.

Then follows the Proviso:—"Provided that this paragraph shall not be construed to prohibit the use of harmless coloring matter in ice cream when not used for fraudulent purposes." It is the office of the Proviso to restrict or limit, or make certain and define with exactitude the intent of the Legislature in the prohibition contained in the preceding part of the paragraph; and it is the meaning and effect of this Proviso that must be determined in order to determine the proper construction of the Act.

When is a harmless color used for fraudulent purposes and when is it not? Manifestly all coloring matter has a tendency to deceive the purchaser as to the quality of the article of food in which it is used. It is used to make the food look better and more attractive and unless its presence is declared, so that the purchaser knows the fact of its use it tends to make him believe that he is getting a better, richer or more palatable article than he really is. But it is not this general tendency of the effect of coloring Foods that the Legislature is seeking to condemn. If it were all coloring matter would be prohibited. We must look further as to the real Legislative meaning. It is a well-known fact that coloring has been used to make one article look like another so that the purchaser believes that he is buying what the article looks like when, in fact, he is getting something else. This is rank fraud upon the purchaser, and in my opinion is in part what the Legislature sought to prevent. If candy were offered for sale that was painted a chocolate color so as to make the purchaser believe he was buying chocolate candy, when in fact no chocolate is present or but a trace, that would be the kind of fraud that is sought to be prohibited. The same thing would be true of the use of a chocolate coloring matter in ice cream where no real chocolate is used. The illustration may be extended through the whole range of foods and food products.

Another class of cases where coloring is not permitted is illustrated in the following: Where a flavoring material is used which also adds color, and the requisite amount of flavoring material is not used but artificial color is added to piece out the skimping of the flavoring and make the ice cream appear to be rich in flavoring when in fact it is not, I think the Law would be violated. For instance, if chocolate is the flavoring and a very small quantity of chocolate is used and this is sought to be supplemented by an artificial color so as to make the ice cream appear richer in chocolate than it is, I believe the law is violated. But of course this brings in question the proper amount of proper flavoring in each case and as formulas vary and manufacturers have no fixed standard, it is only in gross cases that I would advise prosecution.

When is coloring permitted under the Act? I would answer that it is permitted in two classes of cases: First, Where the color used is the same color that would be produced by the fruit or nut or other flavoring used or by the common ingredients of the particular ice cream and the artificial color is added only to make uniformity or to increase the height of the color which otherwise might, by reason of conditions of manufacture, or other conditions, be dull and unattractive. Second, Where the color used is a fancy color and does not counterfeit any of the known colors produced by fruits, nuts or other flavoring material or by the use of known ingredients.

Illustration as to these classes will probably elucidate:—As to the first class:—It is well known that coloring matter is used in butter, but I think no one knows of any other color being used than yellow. Now the natural color of butter is some shade or tint of yellow. When the farmer or dairyman colors his butter he does not color it so that it may be sold as anything else than butter. He does not intend to defraud the purchaser by making him believe that it is something other than what he pretends it to be—butter. But oleomargarine is also colored yellow. Its color, in the absence of coloring matter, is generally speaking, white. When he colors his goods yellow, he makes them imitate butter, and hence his use of the yellow color is calculated to deceive the purchaser and make him think he is getting butter, when in fact he is getting oleo. In this illustration the coloring as to butter is legitimate, as to oleomargarine, fraudulent.

Apply to ice cream: A manufacturer used strawberries to flavor his ice cream. These produce a certain color. The color is well known to buyers. They glance at the cream and because of the color, they say: "that is strawberry ice cream." But suppose because of the condition of the fruit used, either in its ripeness or kind of the season of the year in which it is used, there would be a lack of uniformity in the color of the manufacturer's ice cream, or the color produced by the fruit would not be bright, or uniform or would lack intensity, in my opinion, the manufacturer may add harmless coloring matter so as to give his product the distinct strawberry color. He is not seeking to deceive. He has colored his product a strawberry color and the flavor corresponds.

The second class is illustrated in this way: Suppose at a banquet, or on special occasion, it is desired to have ice cream colored with fancy colors to correspond with some notion of the caterer, and the colors used are not such as would make the ice cream resemble in color any other ice cream, that is ice cream of any other flavor, but said colors are purely fanciful. I see no reason why such colors may not be used. For instance the color may be green. I do not know of any ice cream that by reason of composition, including flavoring is, without the introduction of a substance which adds to the ice cream only color, of a green color. The green color deceives no one. It does not make him think he is getting one kind of ice cream when in fact he is getting another.

I think this sufficiently illustrates my conclusion and for the reasons given I would advise Mr. Crane that he may use a harmless coloring matter in ice cream when "the right amount or sufficient fruit is used for flavor."

Respectfully submitted,

A. H. WOODWARD.

# OPINION ATTORNEY GENERAL ELKIN JANUARY 29, 1896

---

**COFFEE CANNOT BE SOLD, AS A COMPOUND WHICH CONTAINS CHICORY, RYE, WHEAT, PEAS AND OTHER CEREALS OR PRODUCTS, UNDER THE PROVISO TO SECTION 3 OF THE ACT OF JUNE 26th, A. D. 1895, (P. L. 317).**

"The question involved is one of great importance in the construction of the provisions of the Pure Food Law. As I am informed, a firm imports teas, coffees and spices, and, in order to make a cheaper grade of coffee, a certain amount of chicory, wheat, rye, peas, etc., is dried, browned and ground with pure coffee. The mixture thus prepared is sold on the market under a label, "Best Rio," "Prime Rio," "French Rio," or "Broken Java." It is earnestly contended that the proviso to section 3, of the act above referred to, gives them the right to sell such a mixture or compound without incurring the penalties of the law. Acting upon this idea, certain labels containing the words "Coffee Compound," and showing that it is a mixture of prime coffee, English chicory and choice grain are exhibited for the purpose of securing your approval so that this "Coffee Compound" may be sold in our State without interference from those in charge of the enforcement of the law.

I have no hesitancy in saying that, if such a preparation can be sold under the law as coffee, the label is sufficient under the proviso above named. But I am of the opinion that the proviso does not cover an article of food known as "Coffee Compound" such as intended to be sold by this firm, and that any manufacturing for sale, offering for sale, or selling of the same as an article of food, would be in violation of the very letter and spirit of the act referred to.

Section 3 of the Pure Food Law defines what an adulteration is within the meaning of the act of Assembly. Any article of food shall be considered adulterated. "1. If any substance or substances have been mixed with it so as to lower or depreciate or injuriously affect its quality, strength or purity. 2. If any inferior or cheaper substance or substances have been substituted wholly or in part for it. 3. If any valuable or necessary constituent or ingredient has been wholly or in part abstracted from it." These are but three of the seven kinds of adulteration named in the act. Either one of these three definitions is sufficient to brand the "Coffee Compound," offered for sale by the firm, as an adulteration. The addition of chicory, wheat, rye or peas to coffee depreciates its "quality, strength and purity." It is a substitution, in part, of a cheaper substance to take the place of coffe, and it could very properly be said that in such a compound a valuable constituent has been in part, abstracted from it, for part of the coffee is taken away, and a cereal substituted therefor. If the "quality, strength, or purity" of coffee can thus be depreciated under the authority of the proviso to section 3 of the above act, then is the Pure Food Law a legislative dream. If this can be done, then any adulterated article could be sold by simply marking it a compound or mixture. Allspice ground with buckwheat hulls, or cinnamon with hemlock bark, could then be labeled "compound" and sold in the open markets as such. Such a construction would render the act of 1895 a nullity.

The Pure Food Law was intended to provide against the adulteration of articles of food, and to prevent deception and fraud in the sale thereof. The legislation was much needed, and it should be enforced in such a way as to give the greatest security to the public consistent with the requirements of the act. It is true that the proviso to section 3, above mentioned, says that it "shall not apply to mixtures or compounds recognized as ordinary articles or ingredients of articles of food." It is difficult to give any general definition of an "ordinary article of food," that would apply in all cases. It is, however, a fair presumption that no article of food adulterated within the meaning of the definition of section 3, is intended to be exempted by the proviso. The proviso is designed to cover a different class of cases. Any one relying upon the proviso to exempt him from the penalties of the law takes upon himself the laboring oar and the burden of proof is upon him to make out the exemption claimed. What is an "ordinary article of food," within the meaning of the proviso must depend upon the facts in each particular case. I am clearly of the opinion, however, that coffee, adulterated by the addition of chicory, wheat, rye or peas, is not an "ordinary article of food" intended to be exempted from the penalties of the law. On the other hand, it is an adulteration, and cannot be sold without offending against the provisions of the Pure Food Law.

**Commonwealth of Pennsylvania.**

DEPARTMENT OF AGRICULTURE

**BULLETIN No. 241**

PROCEEDINGS OF THE

# Farmers' Annual Normal Institute

AND SPRING MEETING

## State Board of Agriculture

COMPILED BY
A. L. MARTIN, *Director of Institutes*

HELD IN THE TOWN HALL, WASHINGTON, PA.,
MAY 20 TO 23, 1913

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# PREFACE

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 15, 1913.

There is perhaps no source of information upon subjects relating to either practical or scientific agriculture that is so easily available as the Farmers' Institute, and whatever adds to the efficiency of these institutes is of paramount importance. The hope of increasing their usefulness to the farmers of the State has led to the establishment of what is known as the Farmers' Normal Institute, in which all institute managers and lecturers of the State come together once a year for consultation and instruction.

In order that the instruction given at these institutes may be available to the greatest possible number, this Department publishes in bulletin form their proceedings, and so we send out the following bulletin, No. 241, containing the full proceedings of the Normal Institute held at Washington, Pa., May 20 to 23, 1913, in the hope that it may prove helpful upon the many farms and in the many farmhouses to which it may come.

N. B. CRITCHFIELD,
*Secretary of Agriculture.*

## LETTER OF TRANSMITTAL

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Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 10, 1913.

Hon. N. B. Critchfield, Secretary of Agriculture:

Dear Sir: I have the honor to present herewith, bulletin of the Tenth Annual "Farmers' Normal Institute," which was held at Washington, Pa., May 20 to 23, 1913.

Very respectfully,

A. L. MARTIN,
*Director of Institutes.*

# MEMBERS

OF THE

# PENNSYLVANIA STATE BOARD OF AGRICULTURE.

FOR THE YEAR 1913

## MEMBERS EX-OFFICIO

HON. JOHN K. TENER, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN ERLE SPARKS, President of the State College.
*HON. A. E. SISSON, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

## APPOINTED BY THE GOVERNOR

R. H. Thomas, Jr., Mechanicsburg, Cumberland County, ....Term expires 1915
Gen. James A. Beaver, Bellefonte, Centre County, ..............Term expires 1916

## APPOINTED BY THE STATE POULTRY ASSOCIATION

..........................................................................................

## APPOINTED BY THE PENNSYLVANIA BRANCH OF THE AMERICAN POULTRY ASSOCIATION

W. Theo. Wittman, ........................Allentown, ........................1916

## APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer, ............................Lebanon, ............................1915

## ELECTED BY COUNTY AGRICULTURAL SOCIETIES

| | | | Term expires. |
|---|---|---|---|
| Adams, | A. I. Weidner, | Arendtsville, | 1915 |
| Allegheny, | A. J. Purdy, | Imperial, R. F. D. No. 1, | 1915 |
| Armstrong, | S. S. Blyholder, | Kelly Station, | 1914 |
| Beaver, | A. L. McKibben, | New Sheffield, | 1914 |

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*Term expires May 5, 1913.

| | | | Term expires. |
|---|---|---|---|
| Bedford, | Wm. F. Biddle, | Everett, | 1915 |
| Berks, | H. G. McGowan, | Geiger's Mills, | 1916 |
| Blair, | W. Frank Beck, | Altoona, | 1914 |
| Bradford, | F. D. Kerrick, | Towanda, | 1916 |
| Bucks, | B. Frank Wambold, | Sellersville, | 1914 |
| Butler, | W. H. Milliron, | Euclid, | 1914 |
| Cambria, | L. J. Bearer, | Hastings, | 1916 |
| Cameron, | R. P. Heilman, | Emporium, | 1916 |
| Carbon, | | | |
| Centre, | John A. Woodward, | Howard, | 1915 |
| Chester, | M. E. Conard, | Westgrove, | 1915 |
| Clarion, | J. H. Wilson, | Clarion, | 1916 |
| Clearfield, | Harrison Straw, | Clearfield,. | 1916 |
| Clinton, | J. A. Herr, | Millhall, R. F. D., | 1914 |
| Columbia, | A P. Young, | Millville, | 1916 |
| Crawford, | J. S. Patton, | Hartstown, | 1914 |
| Cumberland, | Abram Bosler, | Carlisle, | 1916 |
| Dauphin, | Edward S. Keiper, | Middletown, | 1914 |
| Delaware, | E. J. Durnall, | Swarthmore, | 1914 |
| Elk, | John M. Wittman, | St. Mary's | 1915 |
| Erie, | John J. Rouse, | Wattsburg, | 1916 |
| Fayette, | John T. Smith, | Dunbar, | 1916 |
| Forest, | | | |
| Franklin, | John P. Young, | Marion, | 1914 |
| Fulton, | Frank Rauck, | Hancock, Md., | 1916 |
| Greene, | C. E. Lantz, | Carmichaels, | 1916 |
| Huntingdon, | Geo. G. Hutchison, | Warrior's Mark, | 1915 |
| Indiana, | S. C. George, | West Lebanon, | 1916 |
| Jefferson, | Peter B. Cowan, | Brookville, | 1916 |
| Juniata, | Matthew Rodgers, | Mexico, | 1915 |
| Lackawanna, | Horace Seamans, | Factoryville, | 1916 |
| Lancaster, | J. Aldus Herr, | Lancaster, | 1914 |
| Lawrence, | Sylvester Shaffer, | New Castle, | 1916 |
| Lebanon, | H. C. Snavely, | Cleona, | 1916 |
| Lehigh, | P. S. Fenstermaker, | Allentown, | 1915 |
| Luzerne, | J. F. Hildebrant, | Dallas, R. F. D., | 1914 |
| Lycoming, | A. J. Kahler, | Hughesville, | 1915 |
| McKean, | E. A. Studholme, | Smethport, | 1916 |
| Mercer, | W. C. Black, | Mercer, | 1914 |
| Mifflin, | M. M. Naginey, | Milroy, | 1916 |
| Monroe, | F. S. Brong, | Saylorsburg, | 1916 |
| Montgomery, | John H. Schultz, | Norristown, | 1914 |
| Montour, | J. Miles Derr, | Milton, R. F. D., | 1916 |
| Northampton, | C. S. Messinger, | Tatamy, | 1915 |
| Northumberland, | I. A. Eschbach, | Milton, R. F. D., | 1916 |
| Perry, | Clark M. Bower, | Blain, | 1916 |
| Philadelphia, | David Rust, | Philadelphia, | 1916 |
| Pike, | B. F. Killam, | Paupack, | 1915 |
| Potter, | | | |
| Schuylkill, | John Shoener, | New Ringgold, | 1916 |
| Snyder, | | | |
| Somerset, | John C. Weller, | Rockwood, | 1914 |
| Sullivan, | E. R. Warburton, | Campbellsville, | 1915 |
| Susquehanna, | Frank A. Davies, | Montrose, | 1916 |
| Tioga, | Calvin H. DeWitt, | Mansfield, | 1914 |
| Union, | J. Newton Glover, | Vicksburg, | 1914 |
| Venango, | | | |
| Warren, | R. J. Weld, | Sugargrove, | 1914 |
| Washington, | D. S. Taylor, | Burgettstown, | 1914 |
| Wayne, | Warren E. Perham, | Pleasant Mount, | 1914 |
| Westmoreland, | W. F. Holtzer, | Greensburg, | 1916 |
| Wyoming, | G. A. Benson, | Tunkhannock, | 1916 |
| York, | G. F. Barnes, | Rossville, | 1914 |

# OFFICERS

## PRESIDENT

| | |
|---|---|
| Hon. John K. Tener, Governor, | Harrisburg. |

## VICE PRESIDENTS

| | |
|---|---|
| J. Aldus Herr, | Lancaster. |
| Hon. H. G. McGowan, | Geiger's Mills. |
| S. S. Blyholder, | Kelly Station. |

## EXECUTIVE COMMITTEE

| | |
|---|---|
| Matthew Rodgers, | Mexico. |
| A. J. Kahler, | Hughesville. |
| Dr. W. Frank Beck, | Altoona. |
| D. S. Taylor, | Burgettstown. |
| M. M. Naginey, | Milroy. |
| C. H. DeWitt, | Mansfield. |
| A. I. Weidner, | Arendtsville. |
| F. D. Kerrick, | Towanda. |
| J. Newton Glover, | Vicksburg. |
| Hon. N. B. Critchfield, Secretary, | Harrisburg. |
| R. J. Weld, Assistant Secretary, | Sugargrove. |

## ADVISORY COMMITTEE, CONSULTING SPECIALISTS AND STANDING COMMITTEES AS REPORTED BY THE EXECUTIVE COMMITTEE

### ADVISORY COMMITTEE

| | |
|---|---|
| Dr. W. Frank Beck, | Altoona. |
| F. D. Kerrick, | Towanda. |
| J. Newton Glover, | Vicksburg. |

### COMMITTEE ON RESOLUTIONS

| | |
|---|---|
| M. M. Naginey, | Milroy. |
| P. S. Fenstermaker, | Allentown. |
| Joel A. Herr, | Millhall. |
| F. S. Brong, | Saylorsburg. |
| W. F. Holtzer, | Greensburg. |

### CONSULTING SPECIALISTS

| | | |
|---|---|---|
| Botanist, | | |
| Pomologist, | Chester J. Tyson, | Floradale. |
| Chemist, | Dr. William Frear, | State College. |
| Vet. Surgeon, | Dr. C. J. Marshall, | Harrisburg. |
| Sanitarian, | Dr. W. Frank Beck, | Altoona. |
| Microscopist and Hygienist, | Prof. J. W. Kellogg, | Harrisburg. |
| Entomologist, | Prof. Franklin Menges, | York. |
| Ornithologist, | Prof. H. A. Surface, | Harrisburg. |
| Meteorologist, | E. R. Demain, | Harrisburg. |
| Mineralogist, | Dr. Isaac A. Harvey, | Lock Haven. |
| Apiarist, | H. C. Klinger, | Liverpool. |
| Economic Geologist, | Baird Halberstadt, | Pottsville. |
| Agricultural Geologist, | W. H. Stout, | Pinegrove. |
| Forests and Forestry, | Robert Conklin, | Harrisburg. |
| Feeding Stuffs, | G. G. Hutchison, | Warrior's Mark. |

# STANDING COMMITTEES

## LEGISLATION

| | |
|---|---|
| I. A. Eschbach, | Milton. |
| A. J. Kahler, | Hughesville. |
| H. C. Snavely, | Cleona. |
| H. G. McGowan, | Geiger's Mills. |
| Matthew Rodgers, | Mexico. |

## CEREALS AND CEREAL CROPS

| | |
|---|---|
| D. Frank Wambold, | Sellersville |

## ROADS AND ROAD LAWS

| | |
|---|---|
| Calvin H. DeWitt, | Mansfield |

## FRUIT AND FRUIT CULTURE

| | |
|---|---|
| A I. Weidner, | Arendtsville. |

## DAIRY AND DAIRY PRODUCTS

| | |
|---|---|
| W. E. Perham, | Pleasant Mount |

## FERTILIZERS

| | |
|---|---|
| John H. Schultz, | Norristown. |

## WOOL AND TEXTILE FIBERS

| | |
|---|---|
| Sylvester Shaffer, | New Castle. |

## LIVESTOCK

| | |
|---|---|
| Dr. M. E. Conard, | Westgrove. |

## POULTRY

| | |
|---|---|
| W. Theo. Wittman, | Allentown. |

# PROCEEDINGS OF THE SPRING MEETING OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE, HELD IN THE TOWN HALL, WASHINGTON, PA.

## MAY 20 to 23, 1913.

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**Washington, Pa., Tuesday, May 20, 1913, 9.30 A. M.**

The Spring Meeting of the Board of Agriculture was called to order and the Secretary called the roll. On this and subsequent calls the following members responded to their names:

Hon. John K. Tener, Governor; Hon. N. B. Critchfield, Secretary of Agriculture; Hon. A. L. Martin, Director of Farmers' Institutes; A. I. Weidner, Adams county; S. S. Blyholder, Armstrong county; H. G. McGowan, Berks county; L. J. Bearer, Cambria county; M. E. Conard, Chester county; J. A. Herr, Clinton county; A. P. Young, Columbia county; Frank Rauck, Fulton county; George G. Hutchison, Huntingdon county; S. C. George, Indiana county; Peter B. Cowan, Jefferson county; Matthew Rodgers, Juniata county; Horace Seamans, Lackawanna county; J. Aldus Herr, Lancaster county; J. E. Hildebrant, Luzerne county; W. C. Black, Mercer county; M. M. Naginey, Mifflin county; F. S. Brong, Monroe county; C. S. Messinger, Northampton county; Clark M. Bower, Perry county; John Schoener, Schuylkill county; John C. Weller, Somerset county; R. J. Weld, Warren county; D. S. Taylor, Washington county, W. F. Holtzer, Westmoreland county; G. F. Barnes, York county.

The CHAIRMAN: Next in order is the reading of the minutes of the last meeting.

The SECRETARY: Mr. Chairman, I have a confession to make and perhaps an apology to offer. Recently I have been in the habit of allowing the stenographer to take the minutes of the meeting and then making my minutes from the stenographer's report. Our State Printer has been so busy with the work of the General Assembly, that he was not able to get the report out and I was waiting until the last moment, hoping to get it. Therefore, I have come without the minutes. I have no recollection of any unfinished business. Possibly the Assistant Secretary may have some recollection. I think there is no unfinished business, and, inasmuch, as you have been in the habit at the Spring Meeting recently of dispensing with the reading of the minutes, I thought I would take the risk and have come without them.

The CHAIRMAN: You have heard the Secretary's statement. Do you accept it?

On motion, the reading of the minutes was dispensed with. The Chair then appointed the following Committee on Credentials: Messrs. Conard, Messinger, Brong, Weidner and Hutchison. Also the following Committee on Advertising: Messrs. G. F. Barnes, J. Aldus Herr, H. G. McGowan, S. S. Blyholder and Matthew Rodgers.

The CHAIRMAN: Are there any present who have credentials to present?

The SECRETARY: The credentials of several newly elected members came to the Department ,and when I left on Friday, I took them with me. Circumstances arose on Saturday morning which caused me to think it would be impossible for me to be here and I sent the credentials to Mr. Martin at the Auld House, and I have not had an opportunity to confer with him yet, to know whether he got them.

MR. MARTIN They are at the Auld House.

MR. J. ALDUS HERR: I would like to ask if the credentials are for members whose terms will begin next January? If they are, there is no necessity of having them at this meeting.

The SECRETARY: I would not trust my memory. I think possibly they are for the regular term, but I would not undertake to say certain.

MR. J. ALDUS HERR: If there were, it would not be proper to act on them at this meeting, anyhow.

The CHAIRMAN: What is the pleasure of the Board while waiting for credentials?

The SECRETARY: Mr. Chairman, I would suggest that you might proceed with the next item on the program.

The CHAIRMAN: Very well, then; if there is any Unfinished Business, let us have it at this time.

The SECRETARY: There is none, Mr. Chairman.

The CHAIRMAN: If there is no unfinished business, we will proceed to New Business.

The SECRETARY: Under the head of new business, I think possibly it might be well to appoint at this time a Committee on Memorials. One of the most prominent members of the Board in former years has passed away since our last meeting, and possibly we will want to have a more extended report than we have been accustomed to having. It will give the Memorial Committee an opportunity to prepare a report, and those who have something to say with reference to the adoption of that report, will have an opportunity to prepare for whatever remarks they see fit to make.

The CHAIRMAN: Do you make that as a motion?

The SECRETARY: Well, in order to bring the matter before the Board, I move that a Memorial Committee be appointed at this time to report at the next meeting.

The motion was seconded and adopted.

The CHAIRMAN: The Committee will be appointed later. Is there anything further under the head of new business?

MR. HUTCHISON: I move that a resolution of sympathy and of esteem be forwarded to our distinguished member of the Board, Gen. James A. Beaver. He has been a member of our Board for some years. He has been sorely afflicted for some time. Gen. Beaver has taken a great interest in our proceedings, and I believe it will make his heart warm if he should receive a communication from his friends in this Board of Agriculture. And I would add that the Secretary be instructed to send a telegram of sympathy and of our love and esteem for him.

MR. RODGERS: Mr. Chairman, I heartily second that motion because I am personally acquainted with Gen. Beaver. I was up there short time ago and he is very much afflicted, and some friends there reported to me his condition, and I heartily second that motion.

The motion was then adopted.

The CHAIRMAN: How many shall be appointed on the Memorial Committee?

The SECRETARY: We usually have three members, I believe.

The CHAIRMAN: The Chair will appoint on the Memorial Committee, Mr. Matthew Rodgers, Mr. W. C. Black and Mr. Joel A. Herr.

MR. HUTCHISON: As we do not seem to have a program this morning, and as it is the beginning of this great "Round-up Meeting," and as the program for the afternoon session will be full, I would like to make a report to the Board of what we have been trying to do in the way of securing some legislation that has been endorsed by you for a number of years in your annual meetings, a law for the purity of seeds.

The CHAIRMAN: We will be very glad, Mr. Hutchison, to hear from you at this time.

MR. HUTCHISON: The Department of Agriculture, through its Secretary and others, took up this matter and drew up a bill, and our good friend and fellow-member of the Board, Mr. Wilson of Clarion county, introduced it in the Legislature. The bill, however, was not quite as drastic as the seed men and others interested in it thought it should be, so there was a conference held and a bill was prepared and introduced which passed the House by 187 votes and with none against it. This bill went to the Senate and there the seed people got busy and asked for a hearing, as was their right, and a Committee of Conference was held, of which the Secretary of Agriculture, and Secretary of this Board, was Chairman. The seed people were represented, as well as the Committee of Agriculture of the Senate and the House and the Department of Agriculture. Both sides were heard and all matters were considered. A bill was then prepared and introduced in the Senate. This bill has become a law, and I have forwarded here a number of copies.

You are to be congratulated that the State of Pennsylvania has a law on its statute books that will protect our farmers and agriculturists against the sale of adulterated seed in this Commonwealth. It took six years of hard, strenuous contest to secure the law. There are so many interests involved, such large sums of money invested in the seed business in other states and in our own State that opposed it on business principles. However, we have a bill to-day that is just a little better than the National act, and when you read it over, you will see that there is a scale of variation in it. I want to give each one of you a copy of the bill. You will find it is 97 per cent. pure of our seeds. Now you may think it ought to have been 99 per cent. pure or 100 per cent. pure; but there are small impurities in seeds that cannot be cleand out, and this places us upon a standard equal to that of the National Government, at least. If you will go through the bill and study it well, you will find that it is a step in the right direction, and after the first of next January the Secretary will have this measure for enforcement and I believe, in fact I know, that it is his desire to have this law enforced, and you will be safe in purchasing seed.

There is a provision in that bill that by payment of 25 cents you can send a sample of seed to the Department, or to the Secretary of Agriculture, and have it tested, which is done with a miscroscope, to see how much impurity there is in it. This gives the farmer a chance to send the sample in and he can have a report in a few days, so that when he gets seed or when seed is offered to him, he has that safeguard thrown around him by this legislation, which we consider is a good one. Now that small charge of 25 cents does not go to the Department of Agriculture; it goes into the Treasury, back to you, but it is placed as a little check on people sending in large numbers of samples just for curiosity's sake and other reasons, and the Legislature thought that should be done.

Now I hope that you people will take advantage of this law, that you will study it and that you will demand of the men who are selling or shipping seeds in from other states, that they shall obey this law. I assure you that the Secretary will have it properly enforced and do his utmost, through his officers, to see that the law is properly enforced and lived up to, but we must have the support of the farmers and the farmers' organizations throughout the State. It makes the farmer clean up a little. Some people objected to the bill on that account. Two years ago that was the reason the bill was defeated in the conference committee. My friends, if we do not clean up, how can we expect to require other people to do so.

As we rode down here this morning through this valley, coming into this historic county, we noticed the yellow hops,—I can't recall the name that the Secretary gave,—Barbary plant. Why, it is spreading all over this Commonwealth, this weed with a large root, taking from the earth a large amount of fertility. Why isn't it stopped? Why are you letting this plant grow this way? Shouldn't the farmers of Pennsylvania clean up as well as the farmers of Illinois and Ohio and Indiana and other seed-producing states? I hope that when this law goes into operation, it will have the effect of not only bringing into our State pure seed, but will have the farmers of Pennsylvania clean up and place pure seeds on the market.

**PROF. MENGES:** Is there any provision in that bill that such seeds as horse-metal, devil's paint-brush and others must be absolutely absent from any seed sent into this State?

**MR. HUTCHISON:** Now sir, you will have to study out all this long category. I will give you a copy, professor, after a little while if I can find it.

**The SECRETARY:** There was nothing said about his Satanic Majesty, but it mentions dodder and Canada thistle.

**MR. HUTCHISON:** I will give you a copy of it and you can study it.

**PROF. MENGES:** I am not inclined to study just now, but what I am driving at is this: I am not opposed to the 97 per cent., but I think that in a bill like that, there ought to be a provision that certain weeds should be absolutely absent.

**MR. HUTCHISON:** There is a provision there on that subject. Now some objected to not making the bill more strenuous, but we did the very best we could under the circumstances and we hope that you people throughout the State will make sentiment to raise this percentage a little higher. We had to come to this in order to get a start, and I believe that in two years from now, if you people through your communities talk to your members and arouse sentiment, we may be able to raise this standard a little higher. It is a start, friends, and we will do the best we can with it and hope for the best results possible. The bill is as follows:

## No. 84.

## AN ACT

To regulate the sale of certain seeds; providing for the selection of samples thereof, and their examination by the Department of Agriculture, and the publication of information concerning the same; providing also for the enforcement of the act, and fixing penalties for its violation.

Section 1. Be it enacted, &c., That no person, firm ,or corporation shall sell, offer, or expose for sale any of the following named seeds, within the State of Pennsylvania, containing any of the seeds of dodder or Canada thistle in excess of one (1) seed in three thousand (3,000), and which do not conform to the following standards of purity, as determined by weight:

For medium red clover, mammoth red clover, crimson clover, alfalfa, timothy-grass seed, barley, spelt, wheat, buckwheat, oats, and rye, ninety-seven per centum (97 per centum) pure.

For Alsike clover, perennial rye-grass, German millet, and Hungarian millet, ninety-five per centum (95 per centum) pure.

For white clover, ninety per centum (90 per centum) pure.

For redtop grass, solid or hulled, eighty-five per centum (85 per centum) pure.

For Canadian blue-grass, orchard grass, Kentucky blue-grass, and redtop grass, unhulled, seventy-five per centum (75 per centum) pure.

Section 2. It shall be the duty of the Secretary of Agriculture to receive a sample or samples of seeds from any grower, seedsmen, person, firm, or corporation who shall send such sample to the department for examination; and said secretary shall have sample or samples of seeds examined and analyzed in conformity with the provisions of this act and the standards fixed by the regulation provided for herein. Said examination and analysis shall be made, and reports submitted, showing the condition of the same with respect to the percentage of purity, and freedom from dodder and Canada thistle, to the sender, within fifteen days after the sample is received. A fee of twenty-five cents shall be paid for each examination and analysis, when the sample is submitted, and all moneys so received shall be covered monthly into the State Treasury by the Secretary of Agriculture. For the purpose of this act, the sample of seed shall consist of not more than four ounces, nor less than two ounces, of the seed to be examined. The sample submitted shall have affixed thereto, distinctly printed or plainly written in English, a statement certifying the name of the seed and the full name and address of the grower or seedman, or person or firm or corporation submitting sample for examination and report.

Section 3. Any person acting for himself or as agent for another, or any member or superintendent or agent of any firm or corporation, who violates the provisions of section one of this act, shall be guilty of a misdemeanor, and on conviction shall be sentenced to pay a fine of not less than ten dollars or more than twenty-five dollars for each offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act; and for this purpose he is hereby authorized and empowered, by himself or his duly qualified agent or agents, to collect samples of the seeds named in section one of this act, and to have them examined by a competent expert, who shall report to said Secretary of Agriculture, and also to the persons, firms, or corporations from whom such samples were taken, the condition of the same with respect to purity and freedom from weed seeds; and the report made to the Secretary of Agriculture shall contain the names and postoffice addresses of the persons, firms, or corporations from whom the samples were taken, which reports may be published from time to time for the information of the public by the Secretary of Agriculture, if in his judgment such publication is desirable. The said Secretary of Agriculture, or his agents duly authorized by him, shall, for the purpose of carrying out the provisions of this act, have full access, ingress, and egress to and from all places of business, barns, buildings, vehicles, cars, and vessels in which such seeds may be stored, or in which they may be held for transportation or sale within this State; and shall have power to open any packages containing such seeds, and take therefrom samples of the same, upon tendering to the owner or owners of his or their agents, the value of such samples: Provided, that the owner or owners of such seeds shall be given the opportunity to be present and witness the taking of such samples.

Section 4. Any one interfering with the person charged with the enforcement of this act, or any of his duly authorized agents, when in the discharge of the duties herein enjoined, or refusing such persons the privilege of entering any room, building or other place where the seeds herein named are kept for sale for seeding purposes, within this State, shall be guilty of a misdemeanor and upon conviction shall be sentenced to pay a fine of one hundred dollars, together with the costs of prosecution.

Section 5. The provisions of this act shall not apply to seeds as defined in this act marked "not clean," and shipped to some market or seed merchant to be cleaned and graded before being offered or exposed for sale, or to seeds being held in storage for the purpose of being cleaned and graded.

Section 6. All fines and costs imposed and recovered under the provisions of this act shall be paid to the Secretary or his agents, and by him immediately covered into the State Treasury; and all necessary costs and expenses arising under the provisions of this act shall, after approval in writing by the Secretary of Agriculture, be paid by the State Treasurer upon warrant of the Auditor General, in the manner now provided by law; provided that the amount so expended shall not exceed four thousand dollars in any one year.

Section 7. City magistrates and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and to hold for court or impose the penalties prescribed, subject to appeal as the laws shall direct.

Section 8. This act shall take effect and be in force on and after the first day of January, one thousand nine hundred and fourteen.

Section 9. All acts or parts of acts inconsistent herewith are hereby repealed.

Approved—The 29th day of April, A. D. 1913.

JOHN K. TENER.

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MR. GEORGE: Is it allowable, while one is dissatisfied with his neighbors' plants or seeds, to purchase without a test?

MR. HUTCHISON: No sir, he's got to sell the pure seed to his neighbor.

MR. GEORGE: Is there a penalty attached?

MR. HUTCHISON: Yes sir, otherwise the law would be defective. That is the rock we split on with some of our good friends two years ago. The law passed and went to a conference committee and two farmers, two good friends of mine, held it up on that question and it never became a law, just because they wanted the farmer to be able to sell to his neighbor. He can so deceive himself, but when it comes to selling it to his neighbor, he must clean up.

MR. McGOWAN: I would like to ask Mr. Hutchison what he knows about the seed people now guaranteeing their seeds 99 per cent. pure. I hope this is not a step backward, but we are buying seed from parties who guarantee their seeds 99 per cent. pure, and one party even guarantees 99½ per cent. Doesn't that leave a loop-hole for them to come down the scale a little?

MR. HUTCHISON: A man up in Beaver county stated that he bought a carload of seed guaranteed 99.99 per cent. pure. But the only way for you gentlemen to find out whether those people are selling that kind of seed is to send a sample to the Department at Washington until our apropriation is available. The man that sells seed 99 per cent. pure will be a little ahead of the man who is selling them 97 per cent. pure. The seed men will advertise the seed on their purity, but if we find under this law that the seed is adulterated down below 97 per cent. pure, they can be prosecuted. It does not affect those who are selling them 99 per cent. pure at the present time.

The SECRETARY: In answer to Mr. McGowan's question as to whether this law is a step backward, I would say that it is not and cannot be regarded in any sense as being a step backward. Before we had this bill, there wasn't any limit to the adulteration or to bad seed, what quantity there might be in the seed we were purchasing. But now seed must be 97 per cent. pure, and it may be 99 per cent. or 99.99 per cent. pure, so you see this bill was accepted, after a full discussion of the matter before the Senate Committee, on the principle that it is better to get half a loaf than no bread at all, and there isn't any doubt at all but what that will be reached.

MR. McGOWAN: In other words, we are on the way to 99 per cent?

The SECRETARY: Yes sir, we are on the way.

MR. HUTCHISON: I am sorry that I did not bring along the laws of the different states. I sent and got the laws of the different states, and there are a few of them higher than our standard. We tried to come to the National ruling; there is no National law, but the Department of Agriculture at Washington has a ruling on 97 per cent. or 98 per cent., and we tried to stand alongside of that with our seed people as nearly as possible and were successful; in some we got above that.

A Member: Was there any note taken of the selling of weed seeds as an adulteration for chicken feed?

MR. HUTCHISON: That comes under another law. That is prohibited; you cannot sell weed seeds for food in Pennsylvania.

A Member: I receive samples almost every season, and the variety of weed seeds is enormous. Some people have an idea that the chicken, instead of having feed, should have all kinds of weed seed.

MR. HUTCHISON: If you will, in confidence, give the Department the name of the firm selling such seed, we will endeavor to get a sample of their seed. We prosecuted a number of firms for selling them in our State, especially weed seeds shipped here from the outside as chicken feed, and we have them pretty well cleaned up. There is a great deal of fraud and deception throughout our State in the sale of chicken feed. There is a cheap variety of wheat sold which is mixed with chicken feed, and if our farmers and people who feed chickens would go and buy good red wheat that can be bought now for what price?—

**The SECRETARY:** $9.83 I believe is this morning's quotation.

**MR. HUTCHISON:** If they would buy that wheat and mix it and feed that, they would get a great deal more for the dollar than they get by paying $50 and $60 a ton for a compound which is made up of all manner of things that can be bought at a cheap rate and sold to the people because it is in a convenient form for feeding. You can buy a few pounds from a grocery store and take it home and feed it and it is in a convenient shape for feeding and is well advertised as a great egg-producer; that is claimed and everything is claimed for it under the sun, but if you will take a trade journal you will find that in the market they advertise all manner of wheat that is refuse wheat, for chicken feed. Now, why do they do that? Why, it is put into these compounds, well advertised and sold all over the Commonwealth at a good round sum and has purchasers, of course.

**The CHAIRMAN:** Is there anything further on this subject?

**The SECRETARY:** I simply want to add to what Mr. Hutchison has said, that some of the manufacturers threatened to take us up to the Supreme Court on the weed seed business and we were willing, we acquiesced, if that was their desire, but they didn't take us to the Supreme Court.

**The CHAIRMAN:** What next under new business? We await your pleasure; we are here this forenoon for business. If there are any members of the Board who came in since the roll was called, they will please rise.

**MR. HUTCHISON:** We have with us a distinguished gentleman from the State of Ohio, Dr. Thorne, Director of the Ohio Experimental Station. He is present and I know you would like to hear from him.

**The CHAIRMAN:** Gentlemen, we will certainly be very glad to hear from Dr. Thorne.

**DR. THORNE:** Mr. Chairman and Gentlemen: I did not expect to take up your time this morning, as I come on the program this afternoon, and I came in here to spend the time until then.

We in Ohio are very much interested in this question of the purity of seeds and have been trying for years to get some legislation along this line and that which has just been reported to you. I believe that we have succeeded, this past winter, in getting something of the kind, although I am not able to report the text of the bill, but certainly it is an important matter to do everything in our power to check the constant tendency towards fraud and deception that is practiced along all these lines in the sale of fertilizers and feed stuffs and seeds, and I hope we shall soon learn to go still further than that and to put some effective check upon the sale of fraudulent medicines of all kinds which are so glaringly advertised in our papers today. This of course is not exactly an agricultural topic, and yet it is coming to be such a topic over in Ohio, as we have placed the State Board of Pharmacy, which has something to do with such matters, and also the Board of Examiners of Veterinary Practitioners, under the control of a commission which also takes the place of the former State Board of Agriculture, so that we are gathering all these activities that affect the farm directly or indirectly, under this one administrative Board in the hope that we may gradually introduce effective checks of all kinds upon the disposition to exploit the people for fraudulent purposes, which has been so extremely prevalent in the past. I thank you for the opportunity to meet you and hope to meet you again this afternoon.

DR. CONARD: I would like to have the Committee on Credentials to meet in the side room: Messrs. Messinger, Brown, Weller and Hutchison. I have some credentials, and if any have come in within the last half hour who have credentials, they will kindly pass them up.

MR. RODGERS: May I ask the name of the third member of that Memorial Committee?

The CHAIRMAN: Mr. Black, of Mercer county, your neighbor there.

MR. BLACK: We would like to hear from our Deputy Secretary this morning.

MR. MARTIN: Mr. President, I was just going to ask the privilege to make an announcement at this time. The photographer, representing one of the leading papers of the town, has made a request that all the members of the Board, the County Institute Lecturers and the County Institute Chairmen be here promptly this afternoon at half past one o'clock. It is his desire to take a photograph of the assembly, and the only time that we could name that would be suitable for this purpose would be half past one, just before we convene, to take up the work proper of the program for our Farmers' Normal Institute session. I am certain that this announcement will prompt all the members and their friends to be here at that hour, not that we are so anxious to have our pictures taken, but the record of what we do here is not for this meeting alone, it is for the people of the entire State, and not the state alone, but the part that Pennsylvania bears to the great subject of agriculture, and what we do here in this State Board session and in the Farmers' Institute sessions proper is with the intent to lead us up and on to higher and better and more progressive things along all the lines of agriculture, and hence let us be here in the initiatory of our Farmers' Normal Institute session at half past one in order to accommodate the press of the town that has taken so much interest in our meeting. I believe, Mr. President, that I have nothing else to offer at this time.

MR. J. ALDUS HERR: I would like to make a suggestion along that line. I have seen quite a good many groups of this character and very often those groups are really spoiled by having so many people in the group. Now, if groups could be singled out—we will suppose that one group represents the members of the Board of Agriculture; another group might represent the institute workers or the institute managers, and by doing this the groups could be made smaller and the picture enlarged so that the persons in it could be identified. The majority of our large groups simply show the mass of people who are there. We have them at State College, and at the State Grange, and you cannot recognize anybody; the picture simply shows a mass of human faces there; but if those groups could be made so distinctly that every member could be recognized, it would be a memento of the occasion for future reference and bring to our minds the association we have had together and they would be really desirable pictures, but a group merely showing a number of people present without any recognition does not appeal very strongly to me.

The CHAIRMAN: The suggestion is a very good one and we will just refer that to Mr. Martin and the press to arrange as they deem best or as Mr. Martin prefers to have it, but I would ask all the members to be present promptly at that time so that, if the groups are taken, they will accurately represent the Board of Managers whatever it may be, and not only a few of the members. Is there anything further by anybody? We have yet some time. Is the Committee on Credentials ready to report?

Mr. CONARD: The Committee finds three applications for membership to the Board; one from Philadelphia county, recommending David Rust, properly dated and signed, to take effect last January; also one from Susquehanna county, recommending F. A. Davies, properly dated and signed, to take effect last January; also one from Cumberland county, recommending Abram Bosler, and it is properly dated and signed to take effect last January. That is all we have, and the report is submitted by your committee.

MR. HUTCHISON: I move that the report be accepted and these men elected members of the Board as their credentials indicate.

The motion was seconded by Mr. Seamans and adopted.

The CHAIRMAN: The motion is carried and those three gentlemen are received as members of the State Board of Agriculture. Are there any further suggestions at this time from any one? If not, I will call upon Prof. Menges to come forward and talk to us a few minutes.

PROF. MENGES: Mr. Chairman, I am not sure just why you called for me. I wish you would tell me.

The CHAIRMAN: We want you to tell us something good.

PROF. MENGES: My friends, I would like to make one suggestion; I believe that the newspaper people of this town are thoroughly interested in this meeting. In the meetings that we held in other places, including my own town, the local farmers did not attend as they should have attended. I regard this as one of the great agricultural meetings of the State. Now, I am not sure why the people of my own county did not atend as they should have done, although we had a fair representation of farmers; I say I don't know why they did not. Probably we did not advertise it as we should have, and if our newspapers up here can induce the farmers of Washington county to attend these meetings, I believe that it will be a step forward in the Normal Institute session. When we can get the local people interested, I feel that that is one of the things we ought to do, we ought to strive to get the local farmers here. It is all right for these experts that are coming to address us, to talk to the lecturers, the Institute Lecturers and the County Managers, that is all right and that is really what the institute is for, but we want to reach the farmer, he is the man that we are after, and if we cannot reach the farmer in the county where we hold the Institute, in the county where the Normal Institute is held, it looks to me that maybe we are not reaching him very well in our institute, therefore I would like to see our newspaper representatives make an effort to bring the farmers from the local surrounding country into these institutes if they possibly can. That is one of the suggestions I would like to make.

I asked a question this morning, Mr. Chairman—I haven't a prepared speech—I asked a question this morning in regard to the requirements of the bill that recently became a law, how many weed seeds had to be absolutely absent from the seed that was imported or produced in the State? That to me is an important thing. I say it is most mighty important. Do you know that within the last five or ten years, weed seeds have been distributed over the State of Pennsylvania at such a rate that I don't believe there is a single farmer, and if there is I haven't come across him, I say I don't believe that there is a single farm in the State of Pennsylvania that is not infested with some foreign weed that is most difficult to control. You know there are certain insect enemies and there are certain natural conditions that are ever working against the propagation of weeds, but with that weed the insect is not imported and the consequence is that the weed has free sway, it goes on unmolested, there are no insect enemies that are hurting it and the environment is suited for its propagation and along it goes developing at an enormous rate. Now, my friends, I think that in a law like the one that has been enacted, it should be specified that these weed seeds shall be absent from all seeds imported or produced in the State of Pennsylvania. We have had a lot of trouble along that line. I know very well how difficult it is to legislate weeds out of existence, in fact I sometimes question whether a law against weeds is constitutional—I am not a constitutional lawyer.

MR. HUTCHISON: What does it say about tares in a certain book?

PROF. MENGES: Well, I don't know; maybe that means you and me.

MR. HUTCHISON: Pretty good answer.

PROF. MENGES: I am not so sure. You see you and I are sometimes pretty bad weeds in places. I say I don't know about that.

The SECRETARY: I would like to answer that what is said about tares dont' apply to the seeds when they are being sold but after they have sprouted and are grown; we are not to root them out then to the displacement of the wheat or other grain in which they appear, so that has no reference at all to the constitutionality of the bill.

**PROF. MENGES.** Mr. Hutchison was trying to quote Scripture and I am afraid he is not very well acquainted with the Bible. Well now, I said I hadn't a speech to make, but I want to refer to this matter about how the weeds are propagated and that ,when legislation of that kind is enacted, those things ought to be taken into consideration every time. Now, I said a little while ago that some weeds will run themselves out. You take wild carrots; leave that weed in possession of a field for two or three years and by and by it will disappear. I have seen this happen on numbers of farms right in the State of Pennsylvania. Now there are some weeds that will never run out, they are like the Devil.

**MR. J. A. HERR:** I didn't know we had any such poor fields that remained in carrots.

**PROF. MENGES:** I have seen them in Clinton county.

**MR. JOEL A. HERR:** If any died out in Clinton county, I would like to know it.

**PROF. MENGES:** The wild carrot will run itself out and there are men here who have observed the same thing, I am pretty sure. Now there's one of the weeds that, if we let it go long enough, will kill itself. You take Canada thistle and horse nit, they will never run out, the longer you let them go, the more prolific they become, and those are things I say we ought to take into consideration. Now my friends, I haven't any more to say in regard to this matter, and I thank you very much, Mr. Chairman, for giving me this opportunity. Now if you don't believe what I say, why don't, that's all right, it don't matter to me.

**The SECRETARY:** I don't like to contradict so good an authority as our friend from York county, Mr. Menges, but I don't want the members of this Board to carry away with them the idea that wild carrots or any other weed will run itself out. I know it sometimes disappears, like a good many weeds do. The wild carrot has only one method of propagation, that is by its seed, and when you plow your land after the wild carrot has been there a great number of years, if you will plow it a little deeper than usual, the seeds get beyond the reach of the sun-light and other influences that are necessary to bring about the germination of the seed and you don't see it for a long while; but if you get down at a subsequent plowing you will bring it right to the top and there it is rejuvenated. Mr. Menges, I know, is usually exactly right, but he is from York county where they take such very good care of their land that they don't allow the weeds to continue very long, and his information on that point don't happen to be according to my theory or my observation.

**PROF. MENGES:** I don't like to disagree with the Secretary, he is a pretty good friend of mine, but I have seen wild carrot run itself out in fields that were not plowed. Now that term "run itself out," probably I'd better explain a little better what I mean. I said a little while ago that there are insect enemies that are very preying upon these weeds and they are working in our favor and we have insect enemies of the wild carrot. Now when the insect enemies get ahead of the wild carrot, propagating itself, it will run out. I include that in my assertion that it will run itself out. I might explain a little more, but at the same time, Mr. Secretary, I could take you to fields that were not plowed, where the wild carrot was standing just as thick as it could very well stand and in a few years after there wasn't any there and those fields were not plowed in all that time. I still make that assertion.

The SECRETARY: Well, I will admit the possibility of the seed being destroyed by insect enemies, I had the other thought in my mind, but the other thought I had in my mind came from your expression that it would run itself out.

PROF. MENGES: You said this morning you were a Dutchman and had the right to talk twice.

The SECRETARY: Well, Prof. Menges referred to the Canada thistle and some other plants which he said were not like the wild carrot, that they would not run themselves out. They have more than one method of propagation, propagating from the root as well as from the seed and their tenacity is twice as great as the tenacity of the wild carrot.

MR. HUTCHISON: I have great admiration and respect and esteem and all the other adjectives I can think of for Prof. Menges; I hold him up to-day as one of the greatest Institute men in the State and nation, but when he makes a mistake like this, my mind commences to doubt, I'm a little like Thomas on the question—you don't know where that's written. The running of this seed out is not what Prof. Menges means at all; he means there must be bad seed in this wild carrot and it can't grow. As the Secretary stated, there is only one thing that will run it out and that's good cultivation, raising lots of clover, and that's what they are doing in York county. The clover has run it out or some other crop has come in and crowded it out, but as soon as the time comes that the clover or grass is not there to crowd it out the seed is there that was put in the soil to torment man and will come forth again. I'm an Irishman, so I don't have to plod along as long as the Germans do sometimes to get the thought, but they are nearer right in the end.

I am glad to hear this discussion, and better farming, better cultivation of the soil, more grass growing is going to regulate the weed question to a great extent. Go up to State College and look at the fields where Dr. Hunt put five dollars and some cents worth of fertilizer on that old field and just alongside, you can see the line where the fertilizer was put on, and on the other side of that line the weeds are prospering, but where he put that fertilizer on and raised lots of grasses and clover, he crowded the weeds out and that system of good cultivation, good tillage will crowd out these weeds better than any law or anything else you can pass, on your individual farm. If you grow lots of clover you are bound to get away with these weeds, except something like the Canada thistle and that you can only destroy by continuous hammering and hammering and cutting and cutting and destroying the roots, as the Secretary has stated.

PROF. THORNE: How can you destroy the thistle?

**MR. HUTCHISON:** I have tried a number of ways, but a good hoe and cutting off the plants for several years weaken the root and it will die in time. That is one way. I have tried sowing buckwheat in among it and that has had some effect in reducing the plants; but it is a fight with Satan to destroy the thistle and you must keep at it. It seems to like good limestone land and prosper there, and it is a hard battle to destroy the Canada thistle in our State.

**PROF. MENGES:** I would like to substantiate my veracity in this business. After a man gets up and tells you all that Mr. Hutchison said about me and then comes up and says I am not telling the truth, that's pretty hard on a fellow and I am going to see whether I can establish my veracity after all, or not. That, I suppose, is up to me. In regard to good farming—now, if I had my way about it, I would make every farmer ashamed to raise weeds. That is the first thing I would try to do. I want to tell you that weeds are only an indication that God Almighty can raise a crop where the farmer cannot. That's my definition of a weed. Now, have you any on your farms? Certainly you have.

**MR. BLACK:** Have you?

**PROF. MENGES:** Not many. Mr. Black always asks me questions. I was up on his farm this summer and I happen to know something about it.

**MR. BLACK:** Don't tell it.

**PROF. MENGES:** I say that's the way I look at a weed, but we have them, my friends, we have them, and I don't believe I would ever have a law enacted to exterminate weeds; I don't think I would; I don't think it's any good. I believe in the pure seed law though, that's all right; but so far as having laws enacted for the extermination or the prevention or the reducing of weeds, I say I don't believe they amount to that; in fact, I know they don't. There hasn't been a single one of the laws that has been enacted in the State of Pennsylvania for the extermination of weeds, enforced, not a single one, and there isn't a farmer here, with all due respect to the State Board of Agriculture, there isn't a single member of the State Board of Agriculture here this morning, and maybe I might include the Secretary, I don't know, that hasn't weeds on his farm and is producing them.

**The SECRETARY:** The Secretary can be included.

**PROFESSOR MENGES:** Now, my friends, the statement that I have made, regardless of what Mr. Hutchison says about my veracity, I am going to stand by and I want you to try it, that's all I ask of you. Whatever good farming may be done in your county, there are hundred and thousands of acres in your county, my friends, that are not half farmed, not one-third farmed.

**A Member:** Maybe they can't be farmed.

**PROFESSOR MENGES:** Well then, they produce something else than wild carrots. I say they are, and on those very acres I have seen transacted just the very thing that I have stated here this morning, over and over. Now why should I back down, I'd like to know? I am not going to put my veracity up against two such honorable gentlemen as the Secretary and Mr. Hutchison, but I am going to believe what I stated, anyhow.

MR. MARTIN: This subject, Mr. President, has drifted to pretty near the right place, in my judgment. We all admit that we have weeds on our farms, that is a patent fact. I presume we would admit further that the Creator of all things says that the forces of Nature shall be employed and that we were delegated to control those forces. I presume that within the past year, without giving exact figures, I have been called upon to answer four or five hundred letters coming from the farmers of Pennsylvania asking as to the best method of eradicating the Canada thistle, the wild onion or garlic—those two weeds in particular, the best manner of eradicating them. I have made a pretty close study of that problem, because it is one of the problems with which you and I and every farmer has to deal.

There have been various methods suggested by chemists and certain materials to spray upon the plants and all that, but after careful investigation my answer to these questions has been uniformly about this: If it be Canada thistle and you can cultivate the plot of ground, plow it thoroughly and remove from that plowed plot all the roots you can find and take up and burn them; continue the cultivation through that season in such a manner as to prevent any plant from bringing forth a leaf on that plot; keep up that cultivation for that year continuously and until you have subdued the upper growth of that plant; then get it seeded down to some growing crop of the grasses or the legumes in such a close manner as will not leave room for the growth of the Canada thistle or the wild onion. Now, what is the result? You and I know that requires constant effort and labor and preserverance; of course it does. I have reports from hundreds of these men after two or three years of experience in that direction, answering and saying, "Your plan has worked very well in my case; I have persistently followed it out and the wild onion is giving me no trouble on that piece of land." The man who is going to control these noxious weeds like the wild onion must religiously and perserveringly cultivate and eradicate; that's the method. If you men have got any other method, give it out. We are here to devise ways and means by which we can conquer and overcome and subdue those things. We have good auhority here, Dr. Thorne. I would like to have his suggestion on this very important point of subduing the noxious weeds and keeping them under control in all the states, not Pennsylvania alone.

MR. JOEL A. HERR: I think we have taken up a very profitable subject and one that ought to be given more time. In traveling over five counties, I have looked with alarm at the increase of certain weeds, especially wild carrots, and I must say from my experience, that I simply cannot agree with Prof. Menges in his idea that wild carrots will die down of its own accord. A part of Columbia county is worse for wild carrots than any other district I have been in and the farmers have begun to apologize and say, "We can raise a pretty good corn crop when we plow down a growth of wild carrots." That's the apology for having them. They won't exterminate them and they must have an apology for having them at all, and whenever I see it, I look with alarm at its continuous growth, and I'm telling our own people of Clinton county—we talk that matter up at our Institute and it's a subject of alarm, the wild carrot spreads so easily, and yet it is so easily destroyed. We can keep it out of our farms and in two years entirely exterminate it because it grows from the seed. I look on it with a good deal of alarm, because the plants are left to grow from year to year and continue to get worse instead of better, and are worse all over the country and getting more general.

Now I am not saying anything about those other bad weeds; we are not troubled particularly that I know of, in our county, with the wild onion, but we are with the Canada thistle and you have heard the way to exterminate them. I have found no better way, but the wild carrot is easily exterminated, and yet people let it go, and looking at it out of the car-windows as I go along, they look like fields of buckwheat. I say it's a shame and a disgrace, and the more we talk about those things, I think, the better farmers we make, because whenever you get a farmer thoroughly interested in eradicating weed seeds and weeds of all kinds, you will find that you make a better farmer of him.

**MR. GEORGE:** This has drifted now to a place where I had the thought in my mind when I asked a question in regard to buying the clover seed or grass seed from a neighbor. Now it was answered that I daren't buy; I don't dare buy grass seed from a neighbor although I know this neighbor's seed is perfectly clean of weed seeds, without rendering him subject to a fine; but, as I have probably said in these meetings before, I have two neighbors, one old maiden lady who lives on the west of me, and another one, one of these city farmers that came out and bought a farm beside me and is now back in the city making harness to pay the taxes on his farm on the northwest of me, and those two farms you can hardly walk over them for the weeds; one of the worst weeds I ever saw, it hasn't been mentioned here, called the astor, which is taking up nearly all of those two farms, and the golden-rod and wild carrot. The astor grows up like timothy and you can't distinguish it at a distance until it comes out in blossom and you'd think it was a buckwheat field. I daren't go to my neighbor on the east or south of me and buy a bushel of clover seed that I know is perfectly clean and pure without rendering him subject to a fine for violation of the law, but these seeds are allowed to ripen and blow on me from the west and northwest until it is almost impossible to keep my farm clear of weeds and they are polluting those two farms and going to seed year after year and something needs to be done.

**MR. HUTCHISON:** There is a bill in the Legislature at the present time in regard to the destruction of weeds. I know it is in the Committee of Agriculture; they have spoken to me several times about it and if you people want to get after that committee—you can't tell when the Legislature will adjourn—and if you wish to have this bill become a law, for the destruction of weeds, it is still time enough for you to get after your members. You have got some very active ones, Mr. George Donnelly, Mr. Watson, and others, and you may get it passed along and it may become a law. There is nothing else better able to get a law passed than is this old Board of Agriculture when it gets back at the members throughout the Commonwealth, it don't take long till they become active, but resolutions never bring results if they don't get up from the people to your members and your senators. The law does not prohibit your neighbor selling you that seed, but if you send it down to the Secretary and have the expert examiner find there were adulterations in it, that neighbor is liable to prosecution and fine, but if it comes up to the standard it is all right and I cannot see why my neighbor has any right to sell me seed when he can find out for twenty-five cents whether his seed is pure, and you will find that that neighbor is going to make his seed purer on account of that Act of Assembly. The fine is not oppressive; it is in the hands of the Secretary, who will use judgment in matters of this kind; but we can get a law passed to regulate and destroy these weeds and then you wouldn't have the seed. I want to say to the Professor with due respect, that I didn't doubt his integrity, it was only an error of judgment that I was trying to correct.

The SECRETARY: I want to say, while we are talking about this seed bill, that it don't go into effect until the first of January, and when the time comes that it goes into effect, it will take the Secretary of Agriculture a little while to prepare for the execution of the law carrying it into effect. We will have to get some experts who will make the examination of the seeds, and I am making this explanation now so that you will not overwhelm me with samples of seeds to be examined for 25 cents a sample before the time comes when we can do work of that kind, until the law becomes effective and until we have had an opportunity to prepare for the work.

I suppose we are about done discussing this question and I want to say that my good friend, Prof. Menges, has reminded me this morning of an incident that occurred way back while I was a boy at school in Ohio. I saw two boys, one an athletic-looking fellow, and the other a small boy and they were fighting and the big fellow knocked the little fellow down and started off and the little fellow got up and went after him and started fighting again. The big fellow kicked him on the shins and threw him down again, and again started off, but the little fellow jumped up and started after him and renewed the fight. I said to the big fellow, "Why dont you whip that fellow?" The big boy answered, "I did, but he won't stay whipped." That's the trouble with Prof. Menges, he won't stay whipped.

I don't know whether it is necessary for us to occupy all the time this morning. You know this forenoon is devoted to the State Board of Agriculture. We have gone through with our business and during the few days we are going to be in session, by looking at the program you will see there is not very much arrangement made for play and not very much time for social communication, and whenever any of you think we'd better adjourn, just make a motion to adjourn.

The CHAIRMAN: The Assistant Secretary called on Dr. Thorne and I was going to have him wind up this talk.

MR. McGOWAN: I am glad the meeting took such a turn and such a profitable turn along the line of extermination of weeds. I was annoyed by something that has been spoken of in this discussion, and if I couldn't get any enlightenment from this body I wouldn't know where to go to lay my complaint. I believe in what Mr. Hutchison said, good farming and good tillage is what we need. I have on my farm a field of 13 acres seeded in wheat, cultivated well and fertilized well, and had an elegant crop of wheat, and the clover started nicely and I pointed with pride to the next crop I would get off of that field which would be hay. To my surprise this spring the red sorrel commenced to appear, and now it has taken possession of that field until I am almost ashamed to say that I am a member of the State Board of Agriculture and have to have a field of that kind. Another question came to me, whether I ought to give that field a good coat of lime or not, and just here is where I want to ask a little information.

MR. HUTCHISON: What fertilizer did you use?

MR. McGOWAN: It was a complete fertilizer, something like 2-8-10, and that was good on that field.

MR. MARTIN: Did you ever lime it?

MR. McGOWAN: Yes, I limed it for corn. I got it in hundred-pound packages. I thought it was too trifling when I used that lime, but we were directed by the State College to use it.

MR. MARTIN: What quantity did you put on there?

MR. McGOWAN: Three of four hundred pounds to the acre.

MR. MARTIN: Was that ground limestone?

MR. McGOWAN: Yes sir, the ground limestone, three or four hundred pounds to the acre.

The SECRETARY: Well, that was rather homoeopathic.

MR. McGOWAN: Probably it was.

MR. HUTCHISON: You didn't have a successful crop of hay at all?

MR. McGOWAN: I haven't got the hay. The clover started nicely; it appeared in the stubble splendidly.

The SECRETARY: Was the stubble clipped?

MR. McGOWAN: No, I didn't do that. The rag-weed, as they call it, came up and I wanted to clip it but I had other work and didn't do it.

The SECRETARY: What was the source of the phosphoric acid in your fertilizer?

MR. McGOWAN: Ground rock. Would lime benefit that?

MR. HUTCHISON: If you take it from a plain farmer, I think it would.

MR. McGOWAN: I am rather inclined to think that lime is what I need, because another farmer, who uses lime extensively and condemns fertilizers, his field looks better than mine.

The SECRETARY: I am very sure you need lime.

MR. McGOWAN: We have discovered that the best remedy for thistle, the best thing for the eradication of thistle—I have in mind a gentleman who, whenever he had a patch of Canada thistle, when he went to the depot he would take his hoe and spend half an hour on the patch of Canada thistle with the hoe, and there is not a thistle to be found on his place. Some people make the grand mistake of going around the Canada thistle, not plowing it up. I plow deep and right through it. I put potatoes on a patch of thistle this year in preference to oats, just so it would be hoed out. I think the extermination of weeds is a very important subject and if lime is what I need, I will make an experiment with it.

A Member: Sometimes Canada thistle gets started in our section where it is impossible to use the hoe, and I have found a remedy that has been effective with me, so far. It is all right to use the hoe if you are situated so that you can, but sometimes we get in a place where it is impossible to cultivate it. I have a cider-mill there and two years ago I got to throwing some of the pumice over the Canada thistle and I have never seen the Canada thistle come through it, and I afterwards had some excellent crops where this pumice had been thrown. Whether that will hold good on all crops, I am not prepared to say..

The SECRETARY: How thickly did you put it on?

A Member: I want to ask a question that I hope Dr. Thorne can answer; the eradication of all weeds that have the ordinary way of spreading can be handled by good farming, but these underground sneaks that work below the plow are hard to handle. I have in mind one of our best farms in Chester county; it is pretty well infested, and one field in particular, about ten or twelve acres, is practically sodded with Canada thistle, it is patched all over with Canada thistle, way beyond the hoe. Now I would like to know if Dr. Thorne or somebody can suggest some means of farming by which that whole field can be handled in a way to eradicate that thistle. The proposition is beyond the hoe, and probably there is some crop or some way of handling that field.

DOCTOR THORNE: I am reminded this morning of a story that is familiar to all of you, that in the golden days, when men were riding around clad in armor and hunting adventure, two men met opposite a shield on the roadway and one of them said to the other, "This shield is black." "No," said his opponent, "You don't know anything, the shield is white;" and they bandied words back and forth quite a while and finally went to fighting and when they got through fighting they were on opposite sides of the shield and found that it was painted black on one side and white on the other. That seems to be part of the trouble between those who are arguing this question of wild carrots and similar weeds.

Weeds are not an unmitigated curse by any means. Nature has provided that the plant food in the soil shall be prepared little by little, year by year, for the growth of our crops. It is prepared by agencies with which we are only just beginning to get acquainted. We are learning, however, that the work is going on whether we will or not, constantly going on, and we have learned that unless this prepared food is saved year by year just as it was necessary to save the old manna day by day or it was lost, we have learned that unless this prepared food is saved year by year, a large part of it is lost to us and that there is no way in which a soil may be imporverished more rapidly than by leaving it bare of vegetation and keeping it bare of vegetation from year to year. Therefore Nature has provided that bare soil shall not exist, but shall be covered with vegetation of some sort, wisely provided this. If man neglects his opportunity and does not keep the soil covered with valuable plants, Nature takes it up and covers it with such plants as are adapted to that soil.

Over at the Experiment Station in Ohio, we have been growing for nineteen years past corn and oats and wheat continuously on the same land, year after year, an acre of each, in order to study the effect of this kind of cultivation. We have reduced that land so that we are actually able to produce five or six bushels each of corn and wheat to the acre on it, but when we quit cultivating these crops and put it in crops entirely different from either one, we get a luxuriant growth. That means simply this, that each plant has its own individual tastes and peculiarities. It is able to get out of the soil the food which it needs for its purpose for a certain time, but the time comes after a while, and sooner or later with each plant, when it no longer finds in the soil the food it needs for its purposes and then it gives way to some other plant. Now this applies to weeds just as thoroughly as it does to cultivated plants. You know that when the oaks were cut off the land in Virginia during the war, pines came and took their places. You see the same thing in forest growth as in all other lines of vegetable growths, that plants of different habits succeed each other naturally under natural conditions. I don't say that this is the explanation of the fact that has been stated, that wild carrots will run itself out, but it is a very plausible explanation. I have seen the same thing happen with prairie thistle, taking entire pastures, but after a few years it would disappear and we would have nice, beautiful patches of blue grass, and after the blue grass had been there for a time, the thistle came back again; and this problem of the Canada thistle and all other plants of that character—no plant of that kind can live unless you give it a chance to breathe; the green leaf is absolutely essential to its growth, it is its stomach and its lungs. If you prevent its forming a green leaf for a season or two and holding it a few days at a time, you will kill the plant, whether that be done with the hoe or through cultivation or smothering; it amounts to the same thing. You can kill it with salting or oiling. If you salt it or oil it, its life will spring up somewhere else and you have to repeat the process; but if you prevent the Canada thistle from forming and holding its green leaf for two or three seasons, you will surely kill the plant. Sometimes it will take longer than two or three seasons because you have overlooked some leaves, but by that means you can conquer that weed.

Now, to re-assert again the different feeding habits of different plants—over at the Experiment Station when we first started work twenty years ago, the work was under the charge of myself and my chief assistant who was a graduate of the Pennsylvania State College. I came from over in western Ohio where the whole country around was full of limestone. Mr. Hickman, my assistant, had graduated at State College and was familiar with the experiments going on there. We both had the idea that lime was of very little consequence. In my earlier days we had tried lime on limestone soil and could show no results. Therefore, in planning our experiments we omitted the lime question altogether. We had the impression that it was a matter of minor consequence. We both advocated the theory at that time that all lands have sufficient lime in them for crop purposes, and we actually do find sufficient calcium in all soils for crop purposes, but the point is, that the calcium is not always in an available form, but that we did not know at that time. We started on soil formed from sandstone and shales lying over rocks of that character and laid out our experiments with different fertilizers and different combinations of fertilizers. The farm on which we started this work had been growing clover, and when we first began the work, the new land that had had been under better cultivation, produced clover very well, but within a few years the clover crop began to fail. We thought the trouble was in the method of seeding, that the young plants were frozen out or were perhaps trodden out with timothy. We stopped the Fall sowing of timothy and sowed it in the Spring but that did not improve matters any. Then we concluded that the clover was being frozen out by the Spring frost and began doubling our seedings, sowing once about the middle of March and once a little later. One Spring we sowed three times, until we were absolutely sure that we had a stand of clover, and yet, when the harvest came, we found the ground covered with little spindling clover plants, but when the clover harvest came a year later, there would be a patch of clover here and there and between them, great patches of soil.

We then tried the lime. Our plots were 16 rods long and a rod wide and we applied across all those plots a dressing of powdered lime, using burnt lime in the first case at the rate of a thousand pounds per acre, which we afterwards increased to twice that quantity. The first we put in on the corn crop, and the first effect was not conspicuous to the eye. The corn was followed by oats; that showed very little effect. The oats were followed by wheat and that showed very little effect. We were in the position of doubting then, and it took a good deal to convince us, but when the clover crop came we could not doubt any longer. As far as the field could be seen, the lime was evident between that soil which had lime and that which had none. We continued our liming experiments, growing in rotation corn, oats, wheat, clover and timothy. We continued our liming and we found that as each clover crop came under the effect of the lime, the lesson was so plain that no man could fail to read it. We found, however, that lime alone was not the solution of the question on the unfertilized land. We were liming across fertilized and unfertilized land alike. On the unfertilized land, the lime made a very great difference in the appearance of the clover, but did not give us the full crop; we found that we only got the full yield of clover on land that had been both limed and fertilized or manured, and that in fertilizing we must give at least two elements for clover, those two being phosphorus and potassium. We found that where nitrogen was added, it did not add so much to the clover as the other two, although it was necessary to the grain crops. That question, however, was impressed upon us so forcibly that there was no getting around it. We began our experiments on crop rotation in which corn, oats, wheat, clover and timothy had been started in a five-year rotation like the one I have been describing, fields of ten acres each. We had become so disgusted with the timothy crop, accusing it of spoiling our clover, that we finally cut off the timothy year and reduced our rotation to four years, corn, oats, wheat and clover.

We had learned other lessons in the meanwhile. We had found not only that the crop must have a complete fertilizer, but that it was not necessary that this fertilizer should all be made up of chemicals. We had found that we could draw the nitrogen and potash from the stable much more cheaply than we could purchase them in the fertilizer, but that the phosphorus we must purchase in some chemical carrier, and we had found that the most effective way in which we could use this phosphorus was by adding it to the manure in the stables.

Now, taking the lesson we had learned in that respect from one series of plots, the lesson we had learned in regard to lime from another series of plots and taking still another lesson in which we had found that corn responds more quickly and promptly to manure than does wheat, whereas, wheat responds more promptly to chemicals than does corn, and putting all these together and applying the information in the management of this four-year rotation of corn, oats, wheat and clover, ten acres in each crop, being grown every season, for ten years, this rotation had been going on and given us an average yield of 48 bushels of corn to the acre, followed by 52 bushels of oats and 20 of wheat, and about a ton and a half to a ton and three-quarters of clover-hay to the acre, the wheat having been top-dressed after the old Pennsylvania fashion with open yard manure taken from the stable in August and spread over the wheat after plowing the oat stubble for wheat. We changed our system, and instead of letting the manure lie in the barnyard waiting for the wheat, we put it on the corn in September and October and plowed it under. We then limed it over, using a ton or two tons of ground limestone per acre.

Our soil is acid. Now the chemist will take an acid solution and will drop into that a material carrying alkali. He will drop it drop by drop and perhaps for a considerable period the solution will remain perfectly clear as it was at the start. Finally, there comes a time when a single drop will turn the whole solution and make it cloudy clear through. That last drop was the feather which broke the camel's back, and until that last drop was reached, all the previous drops had had no effect. Therefore we believe that in an acid soil, it is necessary that at the first application sufficient lime be used to correct this acidity and to convert it into a natural soil before any appreciable good is accomplished. After that, it does not take so much lime to keep it in order, but the first application on a soil that has not had lime before, our experience shows that enough lime must be applied to completely overcome the acidity of the soil if we are to accomplish the results we are after. We put the lime on the corn crop after applying it in the manure; the oats we followed after the corn; when the wheat came around, after following a series of experiments, we applied it 400 pounds per acre, of a 4-16-4 fertilizer, equivalent to 200 pounds of a 2-8-2; you will say that was an extravagant application, but the outcome has been that our corn yield has jumped from a previous average of 48 bushels to the acre to an average of 74; our oats yield has risen from 50 to 60; our wheat yield has jumped from 20 to 33; our clover yield has jumped from a ton and three-quarters to over three tons to the acre.

Last year, in this clover field, ten acres of it, there grew on land that ten years ago was refusing to grow clover and was full of sorrel and many other weeds, there grew a field of as magnificent clover as any man ever looked upon, not a weed to be seen anywhere in it. Of course, there may have been some small weeds at the bottom, but not a weed was to be seen as you looked over the field. We cut from that field, in two cuttings, four and three-quarters tons of clover-hay to the acre, a yield that you will see runs the best report of alfalfa very close. That was the final year. We have another ten acres that is coming on this year and the prospects are that it will do as well as last year, but that is the result that has been accomplished by this change.

You will say this has cost a whole lot of money. It has, but after all we are growing on this land now twice the average yield of Ohio in corn and wheat and three times the average yield in hay, as a result of this treatment. Taking the land in its original condition and charging it with the cost of all this treatment, we have a margin of several dollars per acre over and above the cost of the treatment to pay for our trouble and labor, and in this way we are smothering out the weeds.

Now, taking the whole weed question, we have not yet discovered any other way by which the weeds may be kept in subjection than the one Mr. Martin has suggested, that is, by thorough cultivation. Thorough cultivation in food crops is practicable and such treatment of the land as will bring on the crop you wish to produce in such abundance that there will be no room for anything else to grow. Our first lesson was when we undertook to take care of an unsightly patch of sorrel around our buildings. Mr. Hickman first disked the land with a disk harrow; he then limed it and disked that in and then manured it and sowed clover seed and there came up a luxuriant growth of clover which smothered the sorrel completely and we dont have any sorrel where we treat the land fairly; the sorrel comes simply as a sign that we are neglecting something. Sorrel will grow on land that is not acid, but it grows on acid land because it is not crowded out by other crops. It will grow on limestone soil, but so many other crops will grow there that the sorrel does not have a chance. There are comparatively few plants that will grow on acid soil and there the sorrel has its opportunity and improves it.

The CHAIRMAN: Have you any anouncements to make, Mr. Secretary?

The SECRETARY: I have no announcements, but I think it would be well before we adjourn to have any member of the Board who has not responded to the roll-call rise up and give his name.

MR. JOEL A. HERR: I move we adjourn.

Motion seconded and caried.

N. B. CRITCHFIELD,
*Secretary.*

# LIST OF COUNTY INSTITUTE MANAGERS FOR THE SEASON OF 1913-14

| County. | Name and Address of Chairmen. |
|---|---|
| Adams, | A. I. Weidner, Arendtsville. |
| Allegheny, | A. J. Purdy, Imperial, R. D. No. 1. |
| Armstrong, | S. S. Blyholder, Kelly Station. |
| Beaver, | A. L. McKibben, New Sheffield. |
| Bedford, | W. F. Biddle, Everett, R. D. No. 2. |
| Berks, | Howard G. McGowan, Geiger's Mills. |
| Blair, | W. Frank Beck, 1927 W. Chestnut St., Altoona. |
| Bradford, | F. D. Kerrick, Towanda, R. D. No. 9. |
| Bucks, | B. F. Wambold, Sellersville. |
| Butler, | W. H. Milliron, Euclid. |
| Cambria, | Lewis J. Bearer, Hastings, R. D. |
| Cameron, | R. P. Heilman, Emporium. |
| Carbon, | Edward Leinhard, Mauch Chunk. |
| Center, | J. A. Woodward, Howard. |
| Chester, | M. E. Conard, Westgrove. |
| Clarion, | J. H. Wilson, Clarion. |
| Clearfield, | Harrison Straw, Clearfield. |
| Clinton, | Joel A. Herr, Millhall. |
| Columbia, | A. J. Young, Millville. |
| Crawford, | J. F. Seavy, Saegerstown. |
| Cumberland, | T. J. Ferguson, Mechanicsburg. |
| Dauphin, | E. S. Keiper, Middletown. |
| Delaware, | E. J. Durnall, Swarthmore. |
| Elk, | John G. Schmidt, St. Marys. |
| Erie | Archie Billings, Edinboro. |
| Fayette, | John T. Smith, Dunbar, R. D. |
| Forest, | C. A. Randall, Tionesta. |
| Franklin, | J. P. Young, Marion. |
| Fulton, | Frank Rauck, Hancock, Md. |
| Greene, | J. W. Stewart, Jefferson. |
| Huntingdon, | G. G. Hutchison, Warriors Mark. |
| Indiana, | S. C. George, West Lebanon. |
| Jefferson, | Peter B. Cowan, Brookville. |
| Juniata, | Matthew Rodgers, Mexico. |
| Lackawanna, | Horace Seamans, Factoryville. |
| Lancaster, | J. Aldus Herr, Lancaster, R. D. No. 4. |
| Lawrence, | Sylvester Shaffer, New Castle. |
| Lebanon, | Edward Shuey, Lickdale. |
| Lehigh, | P. S. Fenstermaker, Allentown. |
| Luzerne, | J. E. Hildebrant, Dallas, |
| Lycoming, | A. J. Kahler, Hughesville. |
| McKean, | E. A. Studholme, Smethport. |

| County. | Name and Address of Chairmen. |
|---|---|
| Mercer, | Wm. C. Black, Mercer. |
| Mifflin, | M. M. Naginey, Milroy. |
| Monroe, | F. S. Brong, Saylorsburg. |
| Montgomery, | J. H. Schultz, 506 Hamilton St., Norristown. |
| Northampton, | C. S. Messinger, Tatamy. |
| Montour, | J. Miles Derr, Milton, R. D. No. 1. |
| Northumberland, | I. A. Eschbach, Milton, R. D. No. 1. |
| Philadelphia, | S. K. Foster, Torresdale. |
| Perry, | C. M. Bower, Blain. |
| Pike, | B. F. Killam, Paupack. |
| Potter, | A. T. Crittenden, Oswago. |
| Schuylkill, | John Shoener, New Ringgold. |
| Snyder, | F. F. Glass, Freeburg. |
| Somerset, | J. C. Weller, Rockwood. |
| Sullivan, | E. R. Warburton, Campbellsville. |
| Susquehanna, | F. A. Davies, Montrose. |
| Tioga, | C. H. DeWitt, Mansfield. |
| Union, | J. Newton Glover, Vicksburg. |
| Venango, | W. A. Crawford, Cooperstown. |
| Warren, | G. A. Woodside, Sugargrove. |
| Washington, | D. S. Taylor, Burgettstown. |
| Wayne, | W. E. Perham, Pleasant Mount. |
| Westmoreland, | W. F. Holtzer, Greensburg. |
| Wyoming, | George A. Benson, Tunkhannock. |
| York, | G. F. Barnes, Rossville. |

## LIST OF INSTITUTE LECTURERS FOR SEASON OF 1912-13

Anderson, H. M., New Park, Pa.
Anthony, Ernest L., State College, Pa.
Barnitz, Chas. M., Riverside, Pa.
Bond, M. S., Northumberland, Pa.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Clark, M. N., Claridge, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Cornman, Chas. T., Carlisle, Pa.
Davis, H. P., State College, Pa.
Dorsett, E. B., Mansfield, Pa.
Drake, W. M. C., Volant, Pa.
Fassett, F. H., Meshoppen, Pa.
Foulke, Mrs. Jean Kane, West Chester, Pa.
Funk, Dr. J. H., Boyertown, Pa.
Funk, Sheldon W., Boyertown, Pa.
Gardner, Prof. Frank D., State College, Pa.
Given, G. C., State College, Pa.
Gooderham, H. M., Patton, Pa.
Goodling, C. L., State College, Pa.
Hulsart, C. C., Mattawan, N. J.
Herr, Joel A., Millhall, Pa., R. D.
Hibshman, E. K., Ephrata, Pa.
Johnston, J. B., New Wilmington, Pa.
Kester, R. P., Grampian, Pa.
Klein, Dr. Louis A., University of Pennsylvania, Philadelphia, Pa.
Kline, Frank, Spring City, Pa.
Lighty, L. W., East Berlin, Pa.
Mairs, Prof. T. I., State College, Pa.
McCallum, M. H., Wernersville, Pa.
Menges, Prof. Franklin, York, Pa.
Mitman, Howard, Hellertown, Pa.
Murray, D. E., Catawissa, Pa.
Patton, W. M., Mosgrove, Pa., R. D., No. 2.
Peachey, J. H., Belleville, Pa.
Philips, T. J., Atglen, Pa.
Phillips, E. L., New Bethlehem, Pa., R. D. No. 2.
Phillipy, Dr. W. T., Carlisle, Pa.
Row, Chas. A., Yardley, Pa.
Runk, J. A., Huntingdon, Pa.
Seeds, Robert S., Birmingham, Pa.
Stephens, A. W., Hoboken, Pa.
Stevens, Prof. F. R., Geneva, N. Y.
Stout, W. H., Pinegrove, Pa.
Van Noy, Leon Otice, Troy, Pa., R. D. No. 66.
Watts, D. H., Kerrmoor, Pa.
Wittman, W. Theo., Allentown, Pa.
Weld, R. J., Sugargrove, Pa.
White, W. R., State College, Pa.

## FARMERS' ANNUAL NORMAL INSTITUTE

### PROGRAM.

First Session Convenes Tuesday Afternoon, May 20, 1913.

**MR. D. S. TAYLOR, Burgettstown, Pa., Chairman.**

Call to order 1.30.

Addresses of Welcome, W. W. Hoyt, Burgess, Washington, Pa.
T. Jeff Duncan, Esq., Washington, Pa.
R. S. Rankin, Master, Pomona Grange, Hickory, Pa.

Response, by Hon. N. B. Critchfield, Secretary of Agriculture. Harrisburg, Pa.
Prof. Franklin Menges, York, Pa.

1 "THE FUNCTION OF THE EXPERIMENT FARMS."
Dr. Chas. E. Thorne, Director of Ohio Experiment Station, Wooster, Ohio.

Tuesday Evening, May 20, 1913.

### WOMENS' SESSION.

**MRS. MARTHA E. MARTIN, Harrisburg, Pa., President.**

Call to order 7.30.

1. "THE FARM HOUSE."
Mrs. Mary T. Monroe, Dryden, N. Y.

2. "THE COUNTRY BOY."
Dr. A. Holmes, Dean of the General Faculty, State College, State College, Pa.

3. "HOME MAKING A SCIENCE."
Dr. Hannah McK. Lyons, Ceres, Pennsylvania State Grange, Lincoln University, Pa.

4. "WOMEN'S SHARE IN THE FARM PARTNERSHIP."
Mrs. H. B. Fullerton, Milford, Long Island, N. Y.

Wednesday Morning, May 21, 1913

MR. JOHN T. SMITH, Dunbar, Pa., Chairman.

Call to order 9.30.

1. "SELECTION AND BREEDING OF THE DAIRY HERD."
R. J. Weld, Sugargrove, Pa .

2. "PRINCIPLES OF SANITARY MILK PRODUCTION."
Dr. Louis A. Klein, Dean School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

3. "THE HORSESHOE CONSIDERED AS THE BASE OF SUPPORT OF THE LEG."
Dr. John W. Adams, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

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Wednesday Afternoon, May 21, 1913.

MR. J. W. STEWART, Jefferson, Pa., Chairman.

1. "THE AGRICULTURAL PRESS AND THE FARMER."
Arthur J. Anderson, Editor, The Pennsylvania Farmer, Philadelphia, Pa.

2. "THE CITIZENSHIP OF THE FARM."
H. W. Collingwood, Editor, The Rural New Yorker, New York City.

3. "FACTORS CONTROLLING SOIL FERTILITY."
W. D. Zinn, Phillippi, W. Va.

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Wednesday Evening, May 21, 1913.

MR. S. C. GEORGE, West Lebanon, Pa., Chairman.

Call to order 7.30.

1. "CO-OPERATION IN THE DISTRIBUTION AND SALE OF FARM PRODUCTS AND THE PURCHASE OF FARM SUPPLIES."
E. B. Dorsett, Mansfield, Pa.

2. "ALFALFA."
Prof. F. R. Stevens, Agriculturist.

3. "BEST AGRICULTURAL OPPORTUNITIES ARE IN THE EAST." (Illustrated).
H. B. Fullerton, Director Agricultural Development, Milford, Long Island, N. Y.

Thursday Morning, May 22, 1913.

## GOOD ROADS SESSION.

MR. GEO. G. HUTCHISON, Warriors Mark, Pa., Chairman.

Call to order 9.30.

Opened by Hon. John K. Tener, Governor of Pennsylvania, Harrisburg, Pa.

Hon. Jonathan Bourne, Jr., Chairman, Joint Committee on Federal Aid in the Construction of Post Roads, Washington, D. C., is expected to address this meeting.

Hon. Boies Penrose, Representing Joint Committee on Federal Aid in the Construction of Post Roads, Philadelphia, Pa.

1. "ROAD CONSTRUCTION."

   Hon. Edward M. Bigelow, State Highway Commissioner, Harrisburg, Pa.

2. "IMPORTANCE OF DIRT ROAD BUILDING."

   Hon. Edward E. Jones, Hartford, Pa.

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Thursday Afternoon, May 22, 1913.

## FARMERS' INSTITUTE SESSION.

HON. A. L. MARTIN, Director, Harrisburg, Pa., Chairman.

Call to order 1.30.

1. "A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS."

   Messrs. R. P. Kester, Grampian, Pa.
   J. T. Campbell, Hartstown, Pa.
   Franklin Menges, York, Pa.
   L. W. Lighty, East Berlin, Pa.
   D. H. Watts, Kerrmoor, Pa.

2. "THE FARMERS' INSTITUTE, FROM COUNTY CHAIRMEN'S POINT OF VIEW."

   a "County Organization of Institute Committee."
   Hon. H. G. McGowan ,Geiger's Mills, Pa.

   b "Responsibilities of County Chairmen."
   P. S. Fenstermaker, Allentown, Pa.

   c "Advertising; How Best Conducted."
   G. F. Barnes, Rossville, Pa.

   d "Preparing Programs; When and How."
   W. F. Biddle, Everett, Pa.

   e "Local Institute Expenses."
   J. E. Hildebrant, Dallas, Pa.

   f "Should County Chairmen Attend all Their Institutes."
   J. H. Schultz, Norristown, Pa.

   g "Which is Preferable ,Written or Oral Questions."
   J. Newton Glover, Vicksburg, Pa.

GENERAL DISCUSSION.

Thursday Evening, May 22, 1913.

MR. A. J. PURDY, Imperial, Pa., Chairman.

Call to order 7.30.

1. "SOME PENNSYLVANIA POULTRY HOUSES, GOOD AND BAD." (Illustrated.)

   W. Theo. Wittman, Allentown, Pa.

2. "THE MOST INTENSIVE TYPE OF AGRICULTURE." (Illustrated.)

   Prof. R. L. Watts, Dean, Experiment Station, State College, Pa.

3. "IMPROVING QUALITY OF OUR FRUITS." (Illustrated.)

   Prof. H. A. Surface, Economic Zoologist, Department of Agriculture, Harrisburg, Pa.

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Friday Morning, May 23, 1913.

MR. W. F. BIDDLE, Everett, Pa., Chairman.

Call to order 9.00.

1. "REPORT OF RESOLUTION COMMITTEE."

Closing Remarks and Adjournment.

# PROCEEDINGS OF THE FARMERS' ANNUAL NORMAL INSTITUTE, HELD AT WASHINGTON, PA., MAY 20-23, 1913.

Washington, Pa., May 20, 1913, 1.30 P. M.

Mr. D. S. Taylor in the Chair.

The CHAIRMAN: Gentlemen: The hour set for the opening of our exercises has come and gone. We were detained a little while outside to have our pictures taken, but we are glad to see so many of you present at the opening session of the Normal Institute. We will not spend any time talking, as there are other people here better qualified to address you than I am, and I will proceed with the program. The first address of welcome is by Mr. W. W. Hoyt, Burgess of Washington. I have the pleasure of introducing Mr. Hoyt.

Mr. Hoyt spoke as follows:

## ADDRESS OF WELCOME

By MR. W. W. HOYT, *Burgess of Washington, Pa.*

Mr. Chairman and Gentlemen of the Farmers' Normal Institute: It is my pleasant and honorable duty, in behalf of our local committee and our citizens this afternoon, to extend to you a brief and formal word of welcome in the name of that great and illustrious patriot, the one to whom every true patriotic American lifts his hat in reverence and honor, even the name of that first of all American citizens, WASHINGTON. It is an honor, which I do not appreciate lightly, I assure you, to stand here in behalf of our local committee and of the citizens of Washington to extend to you a most cordial welcome to our city. I also welcome you as a body of conscientious gentlemen, gathered here from Pensylvania, representing many sections of our glorious old Keystone State. I shall not attempt to dwell at length upon the vast amount of good that has been done by the State Board of Agriculture and by your various local organizations throughout the Commonwealth, a benefit not only to yourselves and the agriculturists, but a measureless benefit to our State, our entire nation, and the world at large. I feel that I would be remiss in a plain duty were I not to publicly speak of the work of preparation which has been done by the members of your local committee, and if your arrangements are complete, if your stay here during these few days shall prove pleasant and profitable to you, if, when you go away, you shall have a warm heart and a warm place in your affections for the City of Washington, it will be because the members of your local committee have done their duty as good citizens and as loyal members of your organization. I thank you for the kind reception you have tendered me this afternoon, and, as a representative of our people and our city, wishing you success and God-speed in your undertakings during this convention, I again bid you welcome, thrice welcome to Washington.

The CHAIRMAN: The next address will be by Mr. T. J. Duncan, of Washington. I have the pleasure of introducing Mr. Duncan, an attorney at the bar of Washington, Pa.

Mr. Duncan spoke as follows:

## ADDRESS OF WELCOME

By T. J. DUNCAN, Esq., *Washington, Pa.*

Mr. President, and Gentlemen of the Association: If you will indulge me a few minutes, I will then turn you over to the mercy of other parties who are on the program and who will probably have something to say of more interest, and, possibly, of more substantial benefit than I myself will be able to present.

Now, it is a fact, which I presume everybody concedes, that there is no existing condition without a precedent cause; everything that we have around us is the result of something that has preceded it. We who are here to-day, the people of this world who are living at this time, are merely either suffering or enjoying the consequences of past events. The history of to-day, when read in the future, will be merely the logical consequences of something that preceded it. This is illustrated in almost everybody's every-day life. Even our dreams have some producing and pre-existent cause; it may be an over-loaded stomach; it may be a nervous condition or it may be a violated conscience, but as sure as the thing exists to-day, it is traced to something or some power that has gone before.

Now, therefore, there is a reason why I should be here, and briefly I will try and suggest to you some of those reasons. The universality of this idea of everybody having something in mind to which they look as the cause, is illustrated by an incident that occurred in our neighboring city of Pittsburg during one of the expostions there a year or two ago, of which a musical program was a part. On the platform stood a woman in her best attire, and beside her the man with the long hair and the baton which he was swinging and beating about with his arms as she proceeded with her music. In the audience was a lady who had with her her little son of five or six years. The boy of course, as the program progressed, in boyhood ways, climbed up on the seat and surveyed all that was around him, then got down under the seat and inspected everything beneath. The woman grew annoyed and pulled him up and set him down on the seat beside her, and told him to be quiet. For a moment he looked and listened and then said, "Mamma, what is that man trying to hit that woman with a stick for?" He realized that all that effort had some purpose and cause. The woman replied, "He is not hitting her." "Well then," asked the boy, "What is she hollering so about." Now then, there are causes why, as I said, I should be here, and the first perhaps a sufficient reason is that I notice on the program which I hold in my hand that there are to be responses.

Now if there were no preliminary addresses of welcome or expressions of appreciation or something of that nature, what would become of all these responses you are to listen to, which are the real and important feature of this part of your program. If Mr. Hoyt, or myself, or the gentleman who is to follow us in congratulations to you, failed to be here, what would become of the address of your Secretary of Agriculture, which will be full of meat and instruction. And care and a due regard for him requires that we should say something that will be introductory and give him an opportunity and his co-laborer who is to respond in behalf of the Grange, an opportunity to say something.

I would not want him or you, he not having anything to respond to and you not having therefore anything to listen to, to give me, as having failed to come here, such an answer as the young man reported the girl gave him when he asked her if she'd marry him. I can give it better in his own language than anything I could formulate myself, he told it in this way afterwards, when it was over. "I asked a maiden fair, with bright golden hair, if me she would wed. With a gentle smile and a twinkle in her eye, 'See father' she said. Now she knew that I knew her father was dead. She knew that I knew the wild life he had led. Therefore she knew well that I could tell where she meant, when she said, 'Go see father.' "

I want however, before closing to introduce you to Washington county. You are here in our midst, and we are glad to receive you, and I was directed by the committee who brought me to this position —well now, in fact I am like the man was when he had just been married and the guests were gathered around and the wedding feast was on; somebody conceived the notion that there should be some addresses and that the groom should tell what he thought of the occasion, and what he had to say of his expected future life. The time came; he was called upon; he was surprised and embarrassed, and he rose up and unconsciously he put his hand on the bride's shoulder. "Now," he said, "since this thing has been forced on me, I will have to do the best I can." Washington county ought to be, to a Washington countian, like every man's watch and his wife, the best of the kind in the country, and we people who are residents here are apt to entertain that feeling about the locality to which you have come, for which we have no apology to make, because we have within us good reasons for the faith that we entertain and of which we would like you to be as well convinced before your stay with us, toward the close of this week, is ended.

Located as we are, here in the southwestern part of Pennsylvania, bounded by Allegheny and Westmoreland and Greene and Beaver counties, and by the West Virginia State line, we have an area of about 889 square miles, which, located as we are at the foothills of the Allegheny Mountains, consists of beautiful valleys and hill-tops which we think, for natural beauty and substantial qualities, is unsurpassed within the limits, not only of Pennsylvania, but of the entire National domain. In population, we have a little over

143,000 people. In soil, we have what is known as limestone clay, and a rich loam in other sections which is as productive, almost as it is possible to conceive, that the earth anywhere contains. It produces fields of grain of every conceivable kind adapted to the Temperate Zone, and our cattle are scattered abroad throughout the limits of the county over a thousand hills, of all varieties, of good quality and of profitable production to its owners.

We have also a peculiar product in this section of the State, that of petroleum oil, which sends its illuminating influence throughout the entire world. There is nowhere in modern civilization that this production does not go to enlighten the dark hours of the people who depend upon it for artificial light. Washington county not only furnishes this as an illuminating power but it goes to lubricate the machinery of the world and its by-product to produce many effects and beneficial results which it is impossible in the limited time I have here to even suggest. We have a coal area that is unprecedented. There is scarcely a farm in Washington county which is not underlaid with that rich vein of bituminous coal known as the Pittsburg or River formation which has no superior in the production of steam and coke, and of the other things which follow as a by-product of its manufacture. There is nowhere that I know of within transportation limits, that this coal does not command a higher price than any other coal that is produced in this nation that is to be used for the same purpose. Similar coal exists in two or three of the surrounding counties, but it is limited to this region of the State, and we alone, with our two or three neighboring counties, have the monopoly of the coal of this kind and of this quality.

We have, in financial affairs, a state or condition which we think is almost unequaled, and I do not believe is anywhere surpassed within the limits of our nationality. There are in this county, within the territory or boundary of this county, 41 financial institutions, with a combined resource of over $36,000,000. Dividing that by the population, it shows this remarkable condition, and I mention it because it is necessary, in some way, to manifest what the condition is here and what the relation of our people is to these institutions. Dividing it by the population of the county, we have a result of two hundred and forty-some dollars to every individual resident within the boundary of Washington county; or taking the usual estimate that the voter is one-sixth of the population, we have invested in these institutions in some form or other, an average of nearly $1,458. to every adult male citizen or resident that we can enumerate as a part of our population. Now, those figures may not seem large at first blush, but when you think that that is only a fraction of the investment and worth of this county, when you realize that it represents the savings that is put in that particular channel, I don't believe, gentlemen, that when one of you go home, if you will take the opportunity to look at it in the same way, that you will find it not surpassed anywhere within the limits of Pennsylvania. Where there are large populations, where there are more densely populated cities, where there is a larger concentration of wealth, the relation of amount to numbers I think will bring out averages that are away beneath this that we have here.

Let me repeat, that I am presenting this not as evidence of the wealth of the people, but as a suggestion to you of the drift that a portion of that money takes and the large interests that they have in saving, and in financial institutions that indicates a business condition that prevails in comparatively few localities.

These are a few of the things to which I desire to introduce you to-day. The county is spread out; it is for your investigation and we sincerely hope that before your adjournment, as many of you will see as much of its fields, its hills, its woods, its grain, its cattle, as the opportunity allows you to do, considering your obligation to the association here. Now I know that it is impossible to do that, but I could only suggest to enable you to do it in part, at least, the advice that was received by the gentleman who answered an advertisement in a newspaper which, in some educational concern ostensibly advertised that, for a specific fee, they would instruct anybody how they could learn the French language in twenty-four hours. The fee was sent, the answer came and he read in his instructions: "Divide the language into twenty-four parts and learn one part each hour." If you can divide the county into sections amongst yourselves and visit it, you can see as much as possible of it and then communicate with each other the results of your observation.

There is another reason why we want to welcome you to our community, and that is on account of yourselves as individuals and on account of the cause that you represent. This community is always glad to receive into its limits men who represent worthy enterprises, who have honorable purposes in view and who are intelligent enough to bring us something for ourselves from which we may receive benefits and liberal enough to take from us anything they can find amongst us that may be of benefit to themselves. Such being the situation, I do not need to remind this gathering that the interests of agriculture stand pre-eminently above any other interest or enterprise known to human kind. In age, it is venerable. In both sacred and secular history, it is the oldest employment in which the human race was ever engaged, and as time has moved on, it has stood paramount in importance, ahead in usefulness and most marked and distinguished in its character and its results to mankind. The artist in color and stone may boast of the beauty of his productions as they adorn the public places or the walls of exhibitions; the architect may be proud of the products of his profession as they tower toward the clouds and as they accommodate the throngs of human kind, but all things dwindle into insignificance when you consider the results of the agriculturist and his contribution to the welfare of his race. The one plays merely for the entertainment of the people, supplies the desires or the suggestions merely of man's artistic nature of his less urgent physical necessities, but the agriculturist contributes to the absolute needs of every member of the human race and outweighs in importance and overcomes in value and surpasses in its real merit every other enterprise of which we have any knowledge. The representatives of such an enterprise are entitled to a welcome in any community which they visit and we desire to make you welcome to the confines of Washington county.

Now it is not always ability to appreciate our own strength or our own forces without taking a little stock sometimes of what we have in our business enterprises, and the manufacturing and commercial world do this at regular intervals. I don't know whether all of you have thought of what I am about to suggest yourselves, or not; nor do I know whether, in the past, you have thought of the full force and effect of this investigation when it is once made. The report of the United States census for 1910 gives us the information that the total population of this whole country is in round numbers about 93,000,000 people, and more detailed returns, if the published statements that I have recently received are correct, reveal the fact that of that number, 51,000,000 are what is known as a rural or agricultural population, which includes villages less than of 1,000 people, where the interests of the residents are common with those who occupy the farm and cultivate the soil. Now think of it a minute.

What does that mean? It means not that the farmer and the agriculturist represent more in numbers, more in value and more in power than any other interest, but it means that they are a majority of the whole, and hold in their hands the power and the strength and the control of this great nation. If there were an array in which the agricultural interests were represented on the one side and some antagonistic matter on the other, it is in the power of the farmers of this nation to control the election, to name its officers and determine who shall administer its affairs. Taking the same basis that I had a while ago in the estimate of the investment in this county per individual and citizen, those figures mean that in an array wherein there were antagonistic interests, if that were possible in a country where we all have so many common interests, it means that there is a clear voting majority in the hands of the agricultural population of the United States of about one million people, and that they have, therefore, the power, if they were arrayed together on one side, and all the rest of the people on the other, that they could march triumphantly to the accomplishment of any purpose they had in view. Let me ask you now, let me speak to you interrogatively, have the interests of the agricultural portion of the community received the consideration that their numbers deserve, in the legislation, in the distribution of public means, in the halls of Congress? I say have they received the attention that they really deserve on account of their numbers, the importance of their occupation and the respectability of those engaged in it? If not, why? Now why? This necessarily leads ——

A Member: Because they don't stand together.

MR. DUNCAN: A brother here suggests that it is because they don't stand together; or as it occurs to me and suggests itself to every man in this hall, it is the question of organization and cooperation. The old Grecian phalanx, the old Roman legions under Caesar, the hollow squares of Napoleon in his campaign in Egypt and some of his other battle-fields, demonstrated most effectively the power of complete organization against that which was less complete organized and operated. In all those instances, comparatively small bodies of men and soldiers overcame the disorganized groups, and throngs of those against whom they contested and victory perched upon the banners of smaller numbers because of complete and systematic organization and control by those who had charge of the affairs. It is just as true to-day in the affairs of this life in this country as it is elsewhere or as it is in these things that we have. A few men organized and operated properly in the form of police will disperse a mob of men ten times or a hundred times their own number in a few moments' time.

Now we come to organization. The agricultural interests have some things that are peculiarly their own. I don't mean that they are necessarily in conflict with the needs or the interests or any matters in which other people are concerned, because what is for their good in some sense subserves the welfare of the entire population, but that their interests may be advanced, there are times when certain things are peculiar to themselves, and the only way that that interest can be protected and its welfare advanced is for those who are concerned in it to co-operate together. Now, there are organizations in this country that will illustrate what I am referring to here. Railroad engineers have the Brotherhood; railroad firemen have their association, as have also the brakemen. Miners have their Trades Unions in the various sections of the country. Manufacturers of iron and steel and glass and other things are bound together by agreements and combinations which mean that when they move, they move as an organized body, and when Mr. Gompers or Mr. Mitchell or Judge Gary appear in public or before committees and demand or plead for some cause, some specific enactment, the hearers pay them respectful attention because they know that they are backed by a solid phalanx, bound together, which, if results are not produced, will show in the election that is to come in the future.

Now another question, What is politics? I have no doubt that you come here and that you and I and all who are present represent different so-called political organizations; but what is politics? It is simply something that subserves the interests of the individual. Would you, my brother, sustain and co-operate with any proclaimed party organization with a consciousness on your part that it was perhaps to ruin your welfare or destroy your happiness or reduce your weath? You answer that for yourselves. By different courses of reasoning, we sometimes arrive at different conclusions, but is not politics merely the effort on the part of each individual, to accomplish something for his own good and at the same time the good of his neighbors and associates? What then, is the impropriety in suggesting that the farmers, the agriculturists of the country should, so far as they have a common interest, have a means of making that common interest known and demand that it be respected by those who assume to take political place? They can do it, and when they are properly organized, they will do it, and it is coming to that that I want to speak a moment before I close.

I don't know any process or means in existence at this time by which that can be fully carried out except the one organization, the Patrons of Husbandry, commonly known in its local societies as the Grange. I suggest this because, those of you who are identified with it, know its workings and its purposes, will listen patiently to what I have to say. To those of you gentlemen who are not familiar with its organization, who, in your own communities, have stood aloof, I would desire to recommend an investigation, so that, wherever they exist, they will have the moral and the physical support of the men who are a part of their communities and who ought to co-operate with them. The purposes of this organization are set forth in many books and publications, and amongst them the leading one is opposition to Corporate Monopoly.

Now, I haven't time to stop and discuss that. There is not an intelligent man here who is not able to realize and who probably has not more than once felt and reasoned within himself about the great accumulation of wealth in a few limited hands until this country is in danger of supporting what is known as a monopolistic aristocracy as contrasted with the general population, and which will be as effective and as oppressive to our people as the old-fashioned aristocracy of the European monarchies in the countries from which our ancestors fled. There, it was class against class. We, in this free country, are producing a situation by which the aristocratic feeling will be brought to be as oppressive, if not checked in some way, as from which our ancestors, as I say, sought refuge. It is in the hands of the agriculturists of this country to make it, in that respect, what it should be, and produce an equality of our products and our good things amongst the people. Time forbids a further discussion of that; I can only mention it.

Another thing is announced as one of the purposes of the Grange organization, namely, to avoid railroad discriminations. I will not undertake to discuss that now: To secure co-operative dealing; to produce a higher standard of social life, in which I believe the spirit is, to some extent, an acknowledgment of the equality of the sexes in rights as well as intelligence and influence. It is intended to promote a government of the nation by the people, and when these things are accomplished, together with its other objects, the farmer and the agriculturist will stand higher and be entrenched in a stronger position than he has ever been in the past.

Now, can these things be accomplished. Think a moment what has been accomplished. You know it has been said one of our Revolutionary heroes, that there was but one way of judging of the future, and that was by the past. We know only what we may do by seeing what has been done, knowing that equally great results will follow. The Grangers have been in existence but about thirty or forty years; organized in Washnigton City by Father Kelly, first effective in the State of Iowa and have since been fighting, with more or less vigor, the fight for the supremacy of the principles of the Grange.

What have been the fruits of that battle? All over this country, you will find schools or colleges for agricultural purposes, or universities with agricultural departments in them and Experiment Stations in nearly all the states of the Union. Did those things come of themselves? They are the result of a persistent and aggressive agitation whereby the people who had control of these things realized certain rights and gratified them to that extent. Are they what they ought to be? Does the Commonwealth in which we live to-day do justice to agriculture in the institutions which it supports, in part or in whole, in the same amount or to the same extent that it is doing for other enterprises? Why have they been made—have our legislators been made to feel that if they did not, there would be a change in those who administered the affairs of the government?

Another matter that is the result of agricultural or Grange agitation, is, what is commonly known as the Interstate Commerce Commission. Now, this is one of the broadest, most effective and beneficient pieces of legislation that has passed any legislative body within a generation. It has not taken the phase exactly of partisan politics, but it is the result of the agitation which began against discrimination in Iowa, that was felt elsewhere over the country and by the constant aggression of what little organization existed among agriculturists, the nation was brought to realize the injustice of the condition against which it was fighting and this result was brought about. It is not yet perfect, but it is marching onward toward a state of greater perfection and will become more useful year to year. Its powers are great; its officers seem to be, as a rule, independent and make an effort to be just, and many of the evils it has already obliterated have ameliorated the condition of shippers of grain and fruit in common with those in other parts of the country.

Another result attributable almost directly to the Grange efforts and the enlightenment it gave the country, is the rural delivery system. Everybody knows the conveniences of that arrangement, and that was followed by the Parcel Post. If the Granges had been able first by such united efforts as they could make, which are lame because they are not as largely patronized as they should be, but if they had been able to enlighten the public and bring about these results, what can they do in the future if all the people who are interested in the enterprises in which they are engaged, were to unite and co-operate with them? I say that in the future they have a right to expect to accomplish the acknowledgment and recognition of the things they represent and the things that their welfare demands.

Now, gentlemen, I fear that I have talked a little longer than I intended, but I will close with this suggestion, that in this day we are feeling a condition that we ought not. The march is onward. The people are restless. There was a demonstration in two recent conventions in this country, one at Chicago and the other at Baltimore, that demonstrated that the people were determined to have their way about things. It spread all over the world. Witness the recent governmental revolutions in Persia, the overthrow of the hoary aged dynasty in China, and nearer home, the marked denunciation and overthrow of the restrictive power of the House of Lords in England, whereby the people demanded and compelled the other side, or the aristocratic feeling, to yield to their demands and their necessities.

The same thing is taking place in this country. There is a demand on the part of the public toward democratic or popular management and administration of the affairs, and if the people will persist, that will be brought about. In our nation, two important steps have recently been taken, the authorization of an income tax by a majority of the states of this nation, and the recent announcement that the election of United States Senators is hereafter to be made by the people and not by a selected few. There is now pending in Harrisburg a bill in which we ought all to be interested, known as the Utilities Bill, in three forms, existing there, and it should receive the attention of the people to make their feelings on that subject known to their representatives, that great good may be accomplished by the enactment of proper legislation in that particular. The agricultural men can aid if they want to. They will, by organization such as I have suggested here, and by thorough support of the Society that was within their own limits and convenience, produce and accomplish the good legislation to which they are entitled.

Now, I have ventured to introduce the community into which you come. I have possibly gone a little further than I intended to in suggesting the things for your consideration and interest. Carry home the thought, if I have given you any that is good. If I have made utterances that are not right, dismiss them and excuse me for a misjudgment, and I trust that with this condition, I have not said anything that is offensive and that some good may come of the subject that I have suggested, as well as the other benefits upon which you shall deliberate during your visit here.

The CHAIRMAN: We will further be addressed along the line of welcome to the county of Washington by our young farmer friend, R. S. Rankin. I have the pleasure of introducing to you Mr. Rankin.

Mr. Rankin spoke as follows:

## ADDRESS OF WELCOME

By R. S. RANKIN, *Washington, Pa.*

Mr. Chairman, Board of Agriculture and Friends: In behalf of the farmers of Washington county, and in the name of the Grange, I certainly welcome you into our midst. To go on and tell you the good that Washington county is or how we believe in Washington county—my predecessor has told you; but I will tell you this, that we are all proud of our county. I am reminded of the little saying, that when a man can't make a living in Washington county, he'd better just die, because he can't make a living any place else. You have been told of our coal and oil, you have been told of all the natural advantages that you will find in this county, if you will find them anywhere. If you want anything to burn, you can burn anything at all. We have got coal and oil and gas and wood, so you can just take your choice. And as to water, we have it right out of the ground; you don't have to pump it even, and all these things I want you men to see while you are here. We welcome you into our county, because we know that you are a body of men working for our interests. You are all honorable men. Brother Taylor has told us that you are all Grangers, and that is the best proof that you are honorable men.

Now, kindly excuse me if I talk along Grange lines altogether, because you will take notice that I belong to the Grange. Our worthy agricultural expert here blames me for blowing the Grange too high sometimes, but I know he will forgive me if I talk a little on Grange lines today. I want you members of the Board to see our resources. I would like you to come out over the country. You will learn that we are a cattle and sheep county. We've got good sheep yet, as good as you will find any place. We don't have the number we used to have, but we've got as good cattle as can be found anywhere. At the Chicago Fat Stock Show, we had the best steer for two years. We have got as good horses and hogs as can be found anywhere. Outside the door I met a man from Lancaster county, and he thinks they've got good things there. So have we. You folks have done a great deal for us. I want to thank you. We appreciate how you have got our State College to the place it ought to be and are trying to get it better, so we can educate our boys to stay on the farm and we appreciate the efforts you are putting forth to get more appropriations for our colleges and we appreciate the good work you are doing in the county institutes. Along in February, I was out at the little town of Hickory. It is paved with brick and its gates are pearly white and its inhabitants are made up of retired farmers and old maids. Even Brother Taylor is thinking of moving there. Maybe he will get a wife. There's where those men met last winter and gave us a great many ideas that we are going to carry out.

Then there's another thing I wish to speak of—the county expert. We learn a great many things from reading, and hear a great many things, but sometimes can't put them into practice; but the county expert we have here goes out on the farm and sees our mistakes and tells us of them. If we have done a good thing he pats us on the back and tells us about it and we greatly appreciate what he has done and hope he can stay with us from year to year.

And we also appreciate what you gentlemen have done in the way of legislation. You are getting for us a great deal. You haven't got it all; you can't get it all. Politics has a great deal to do with it and the farmers sometimes don't understand it.

It's a good deal like the story I heard of a man, a typical farmer, where they were putting a telegraph line through his place. They came along with their poles and diggers and commenced to dig. He said, "This is my land; what are you doing this for?" They said, "We've got the papers out here and we are going right through." He didn't know about that, so he went back to the barn and turned out his fine Jersey bull, and the bull went out to where workmen were and they took to the tall timber and climbed those poles, and after an hour he went out to them and said: "What are you men doing?" They replied, "You take that fellow out of the road." He said, "Why didn't you show him your papers?" That Jersey bull is the Grange, and the Grange has got to switch its tail and paw the dirt, and whenever the Grange does that, remember the politicians will take to high places, and we are not going to call the bull off, either.

Now, gentlemen, I am going to make mine short, because I know we haven't got the time. I want you to consider that you are welcome in our county. Visit every place of interest we've got and the place of most interest is our farms. We are glad to have you come, and we know that in your meeting here this week you will devise things for our good and will lead up to better and better things, until the farm will be the happiest place on earth.

The CHAIRMAN: The first response will be by the Hon. N. B. Critchfield, Secretary of Agriculture of Pennsylvania. I have the pleasure of introducing to you Mr. Critchfield.

Mr. Critchfield's address is as follows:

## RESPONSE TO ADDRESSES OF WELCOME

By HON. N. B. CRITCHFIELD, *Secretary of Agriculture.*

Mr. Chairman, Mr. Hoyt, Mr. Duncan, Mr. Rankin, and other Citizens of Washington County: I certainly voice the sentiment of all the members of the State Board of Agriculture, and the Farmers' Institute force, when I say that we are glad to be with you. We have heard of your fame in the respective sections of the country from which we come, and we are just as glad to be here to receive this welcome as you are to extend it. You, gentlemen, have said in part that you are glad to welcome us because of what we are and of what we are doing, and we are glad to be here to partake of your hospitality because of what we know you are and what you have been doing in the past.

You know the people that are properly brought up always have great respect for age, and we recognize you as one of the oldest counties in Western Pennsylvania. I believe I am right in saying, that Washington county was the first county created under an Act of Assembly after the Declaration of Independence. Is that correct? I think it is. And you have further shown to the world your antiquity by being the mother of some of the little counties around you, such as Allegheny, Greene and Beaver; and for this reason, if for no other, we would come here with feelings of profoundest respect for Washington county.

We have heard of your rich soil and your abundance of the good things with which kind Providence has blessed this grand old Commonwealth. We, over in Somerset county, the place from which I come, have known something of the fine stock you raise in Washington county for a number of years. Thirty years ago I placed at the head of my herd of cattle a young animal that was brought from your county, as fine a specimen of the short-horn Durham as I ever saw anywhere, even in the blue-grass region of Kentucky. Mr. Duncan failed to mention sheep, but I was glad to hear Mr. Rankin say that you still have your sheep. Somebody said today that in recent years you have more dogs in Washington county than sheep. That is certainly very unfortunate, yet I hope you farmers of the county will remember that a fence strong enough to turn a dog that is large enough to kill sheep, can be built at no very great expense, and a woven wire fence of that kind will turn the dogs, and if the Congress of the United States would look upon your industry favorably, I do not see why you should not enjoy this prosperity as you have done in the past.

The first member of the first State Board of Agriculture from Washington county that it was my privilege to become acquainted with, the Hon. John McDowell, has gone to his reward long since. He was a man who was revered in the State Board of Agriculture, and I am very glad that when he was called from labor to reward, the people of your county saw that his place was well filled by those who have succeeded him. He came to my mind when I was speaking of the sheep industry, your wool industry, and that brought up the thought that your county has the honor of furnishing the wool of which the cloth was made that made the suit of clothes that was presented to President McKinley for the day that he delivered his inaugural address. A sample of that cloth was submitted to me at that time for my examination. I was then Chairman of the Senate Agricultural Committee of the State of Pennsylvania and Mr. McDowell brought a sample of that cloth down to Harrisburg, and I had the pleasure of seeing what it was like before it was made. These things have come to my mind while I was listening to the addresses of welcome.

We were glad to hear of your wealth, the natural wealth that you possess. We were glad to hear of what you were doing in these recent years, and I didn't know but that possibly some mention would be made of the fact that Washington county stands among the very first in Western Pennsylvania in the great educational work for which the people of this section of the State are noted. I believe that the first literary institution in Western Pennsylvania, west of the Allegheny Mountains, was established right here in Washington county. The first one, if my memory serves me, was established a short distance north of here, at Canonsburg, and that was followed a short time after by an institution that was planted at this place which, a little more than a score of years ago, absorbed the older institution, and is now the only college that you have in the county. Is that right?

So we respect you, not only as being good farmers, but because of the fact that you are educators. I remember hearing Washington College and Jefferson College spoken of when I was quite a small boy. The Hon. Jeremiah Black, who was a member of President Buchanan's Cabinet, and who was one of the most noted jurists that was produced by this State or any other in this great country, was at my father's home when I was a little boy, and I heard him speak of the colleges here in Washington county, and if my memory serves me, I think he said that he had been a student here, either that, or that some of the law students who were then in his office, were students at the Washington or the Jefferson College. These things I have recalled as I have been sitting here listening to these addresses of welcome.

I really did not expect to have anything to say here today. Mr. Martin said to me a few minutes ago—asked me whether I had noticed that he had placed me on the program to respond to an address of welcome, and I laughingly said, "Yes," but I thought it was all a joke, until I was on my way here and looking over the program, discovered that it was more earnest than jest, so I have no prepared speech. But I want to assure you, Mr. Chairman, and gentlemen, and all the others, that we are very glad to be here, and possibly I might occupy a few minutes.

Just now there comes to my mind a little incident that occurred to me when I was a boy in the section of the country from which I come. A party had gone out of an old-fashioned protracted meeting one night and we were riding on the sled of one of the old men of the neighborhood who was known to be a very slow driver. It was a beautiful, moonlight night and all at once it was discovered that he was whipping up his horses and driving at what was, for him, a fierce rate of speed. Someone said, "Why do you drive so fast?" He answered, "I see that one of my sled soles is nearly worn out and I want to get home before it is entirely gone." So we must get through before we have expended all our energy and it is necessary for us to hurry along.

I want to occupy, however, just a minute in telling you who we are. You have spoken of us as farmers and members of the Grange and we are proud to be regarded as such. I appreciate that and I think we all appreciate what was said by one of the speakers, when he referred, not only to the antiquity, but to the honor of the profession to which we belong, and you will understand that we do regard agriculture as a profession, as one of the learned professions. It does seem to me that the farmer needs to be a more thoroughly educated man than any other man. He comes nearer to the great forces of nature. He has more to do with the forces of nature than does the man who belongs to any other vocation, or is engaged in any other business, and hence, I say, he ought to be a most thoroughly educated man.

We are here, not simply as members of the State Board of Agriculture, but we are here as Institute Instructors, as Institute lecturers. The work that is being done by the State Board and by the Department of Agriculture has been referred to—the Institute work in which we are engaged. This entire State has been covered every year for about twenty-five years. I am not able to tell just now, off-hand, how many years this work has been going on in Pennsylvania, but I know that it began somewhere back in the 70's, and at the present time we have about seventy lecturers engaged in this work in this State. These men travel all over the State during the fall and winter seasons, when farmers have time and opportunity to attend the Institutes, and give instructions to the farmers as to the methods of cultivating their soil, of taking care of their trees, of pursuing every particular line of the farming industry.

It is true that these men are not all graduates of an agricultural college. Many of them have graduated from the school of the farm itself and got a very large amount of their education between the plough handles, or at the end of a shovel or a corn hoe, or some instrument of that kind, but we have come to understand in recent years that all knowledge is scientific knowledge. In fact, the word "science" itself signifies knowledge. It comes from "scientia," to know knowledge; therefore, that which is definitely known is scientific knowledge. We have among us here today men who perhaps have never been students in college, but who understand their business as farmers. They have come to understand the proper methods, by their own experimentation, of cultivating and fertilizing the soil, of using the right kind of seed, of taking advantage of the seasons, just as though they had learned it in school, and this is the class of men that are being sent out by the Department of Agriculture, or by the State Board of Agriculture, if you please, all over the State of Pennsylvania. The farmers of the present day, in Pennsylvania, and not only in our own State, but all over this country, have great reason to be thankful for the advantages they enjoy above those that were enjoyed by their fathers.

The Federal Department of Agriculture has sent men all over the world in order to discover new plants and new seeds and bring them here into our own country. We have had seeds that were grown in Siberia and away off in Norway, brought into America, and they have been planted in some of the northern sections of our country and have brought forth excellent results in sections of the country which were never supposed to be adapted to their growth, and this information has been gathered up by the farmers and has been applied upon their farms. They have worked out very many of the problems that have become the most important problems that were taken up and studied by the agricultural colleges of our country, and so we are here as instructors, going over the State of Pennsylvania during the proper season of the year and doing whatever we can to assist the farmers in the great work that is upon their hands; and it is certainly a great work.

We are talking just now about the possibility of war. I do not believe that there is any likelihood of anything of that kind coming upon us, and yet there is a possibility, while there is, to my mind, no probability, but, sir, in case there should be a war, the position that is occupied by the farmer is just as important as that occupied by the soldier or by the general of the army. It is not only necessary that our armies shall be well equipped in case of war, but there must be something to support the army. During the Civil War, in which quite a number of us, we older members of the State Board of Agriculture, had some part, we were successful, not simply because we outnumbered just as brave a class of men as were to be found anywhere, but we were successful for the reason that we had sufficient population to have people enough at home to be raising the grain and the horses and the beef and the other things that were needed for the support of the army; and so I say, that the farmer is not only here to feed the people in time of peace, but he is here to stand in support of the armies that must go forth to fight the battles of the nation.

I don't think that the gentleman who delivered one of the addresses of welcome, I refer particularly to Mr. Duncan, I don't think that he went any too far when he spoke about the great importance of the work in which we are engaged. What would become of the whole country, if for six months the farmers of the country were to stop their operations? We cannot think of any greater calamity being possible to come upon any people anywhere than would come upon us, if this were the situation that we had to meet.

Now, then, we are glad to be here. I am glad to be here, particularly, because, while I was sitting here, the thought came to me that, although my ancestors were not born and bred in Washington county, my great-grandfather was a citizen of the county for awhile, and at the close of the War of Independence, he, with four brothers from Washington's Army, who had entered the army from Virginia, at the close of the War, came here to farm, and my great grandfather went back to the eastern slope to find a brother who had not come out with the others, and passed through Somerset county and decided that it was a land overflowing with milk and honey and he would cast his lot there, and so I happen to be a native of

Somerset county, simply because by great-grandfather thought he had found in it a better land. The others went out to Ohio and the Critchfields of Holmes and Wayne counties, Ohio, are part of the same family, and I am glad to come back here and enjoy your hospitality for this reason, if for no other.

I thank you, Mr. Chairman, for the attention you have given me, and I thank you, on behalf of this meeting, for the very cordial welcome we have received.

The CHAIRMAN. The next address along this line will be by my friend, Prof. Franklin Menges, of York county, Pa.

Prof. Menges spoke as follows:

## RESPONSE TO ADDRESSES OF WELCOME

By PROF. FRANKLIN MENGES, *York, Pa.*

I cannot claim any ancestral relation to this county; I suppose you notice it by my speech, don't you? History, is in order. You know we fellows in the eastern part of the State think that we are sort of guardians of the rest of you people; we are older than you are and we have learned a little more about farming than you have, and we have some sort of a notion that we can look down upon nearly any class of farmers, just as soon as we get across the Allegheny Mountains, at any rate.

Now, when it comes to age, you are ahead of us. Do you know that Queen Elizabeth gave this territory, in which your county is located, to Sir Walter Raleigh, her paramour, March 25, 1584, long before there were any Dutch in New Holland, or New York; a long while or nearly a century before William Penn landed in Philadelphia and brought all the Quakers over here, among whom he brough my friend, Dr. Conard. And then he had a lot of Dutch with him. He brought Kester along, too. A century before that time this territory already belonged to England, and to an Englishman. So, in history, you are really way ahead of us. We cannot look down on you.

Now, my friends, we have another pride over there in the eastern part of Pennsylvania and that is, we are proud of the fertility of our soils. We think we have the best soils in the State of Pennsylvania, and that is pretty near true. But when we come to Washington county, we find that you have just as good soils as we have, even in Lancaster county, and I don't see Mr. Herr here, or he might object. We find that in Washington county you have naturally as fertile soils as we have in Lancaster or York or any other of the eastern counties, and that you can produce just as large crops of the various cereal grains as we can in the east.

And then another thing, you have a greater variety of soils. There are just three formations in this county, geological and in spots—my friend, Mr. Stout, will enjoy this—it's first the lower barren coal measures, then the upper coal measures and then the upper barren measures. The first are confined to the northern part of this county, the second largely to the central part, and the third largely to the southern part of the county. In that upper barren coal measure formation, there are about 170 to 200 feet of limestone strata interwoven with shales and sandstones, mixed up in such a way that we don't have anything like it in the eastern part of the State. When you have a mixture of limestone and shale you can make one of the best soils that can be made anywhere. Now, my friends, we don't have anything like it.

Another thing that you have that is a great deal better than our conditions is, that you have coal and oil, already referred to. I heard of a man here in Washington county who had two hundred acres of land. He sold the Pittsburg coal vien under that land for $700 an acre and he had an oil well on that farm from which flowed at the rate of 7,000 barrels of oil a day, at $1.85 a barrel, and he had a soil on top that would produce at the rate of 100 bushels of ear corn to the acre during any normal season. Now can you beat that?

The SECRETARY: And his name was not Job, either.

PROF. MENGES: I don't know anything about that.

The SECRETARY: Why, you spoke of the days when the hills poured forth rivers of oil. I just happened to think of it.

A Member: That's in the Bible.

MR. HUTCHISON: He don't know anything about that.

The SECRETARY: Buy yourself a Bible.

PROF. MENGES: I'll have to stop associating with you. Well. I simply refer to these matters. I say I don't remember about that story of Job.

The SECRETARY: Well, he was a farmer, too. He washed his steps with butter.

PROF. MENGES: Yes, he's too rich for me. I can't keep up to that standard. That suits you and Seeds better than me. I said, that historically and in productive capacity, and in coal and oil you are ahead of us. My friends, that is all true.

There is another side to this question; there are some things you don't know and I might just as well tell you about them when I am here, because I don't expect to get back again. You know that in Washington county, you have 551,708 acres in farming land. Out of that—553,000, I should say—do you know that you have only 503,000 occupied in farms today? Now just think of it, that there should be at the rate of about 45,000 acres of farming land in the county of Washington that is not farmed. In 1900, you farmed 23,000 acres more than you farmed in 1910, or in other words, you have gone back at the rate of 23,000 acres in ten years. Your population in 1900 was 83,000, or a little lower; in 1910, it was 143,000. Your population has gone up at the rate of between 30 per cent. and 40 per cent. and your farming land has gone back at the rate of about 5 per cent. to 6 per cent. My friends, that is not a very pleasant condition to look forward to with the advantages that you have. I say these are things we ought to consider. You had a population of nearly 50,000 more people to feed in 1910 than you had in 1900, and yet you farmed 23,000 acres less of your land in 1910 than you did in 1900. And let me say to you, my friends, that that condition prevails over the entire State of Pennsylvania. Even Lancaster county, the farming county of the State, farmed about 3,000 acres less land in 1910 than she farmed in 1900, and when you cut across to York county, we are farming about 10,000 acres less than we farmed in 1900. Not only is that true, but here is another condition. I will go back to 1870 and I find that in Washington county, in 1870 there were 428,000 sheep, and in 1910, there are only 196,000, and all under the Protective Tariff! We had a tariff when that thing happened; now just think of it, and I'm a Republican!

A Member: I wouldn't acknowledge it.

PROF. MENGES: Well, there are a good many things you dare not acknowledge. Are you going to keep quiet now? I said I was a Republican. And another thing, I am a Protectionist, but just think of it. But I say that in 1870 there were 428,000 sheep in Washington county, and in 1910, only 196,000, and all under protection.

My friends, it looks to me as if you and I had better look a little further than protection about the sheep business. That's the way it looks to me. I am inclined to think that there is something else that you and I had better be about than the protective system. If that farmer with the protective system could not obtain a price that would justify him in keeping sheep, what good did the protective system do him? Isn't that a fair question?

The SECRETARY: Well, he didn't get protection from the dogs.

PROF. MENGES: I am not talking about dogs now. Did the price of wool with protection stay up to what it was in 1870? It should have, and why should it? Because there were more people to clothe. In 1900, you had 83,000, if I mistake not, to clothe here. In 1910, you had 146,000 to clothe. Now don't you think that the price of wool should have stayed up and gone up with protection behind it and the increased number of people to clothe? I should think so, that is only logical to think so, but what is the trouble? Now, my friends, the Farmers' Institute is an institution for the purpose of training the people. You agree with that, Mr. Seeds, don't you?

MR. SEEDS: That's right.

PROF. MENGES: And it is especially an institution for the purpose of training the farmer. Now you and I and every one of you that are before me this afternoon have gone over the State and tried to induce these farmers to produce more and more, and that is the fundamental thing to do. There is no question about it, in my mind, that is the first thing to do, to get the farmer to produce more. I am decidedly in favor of it and there are a great many reasons why I should be. Among the first one is because for his own benefit he must do it. But there is a greater reason than that even, and that is the maintenance of the industrial system that you and I have helped to produce in this country, the greatest industrial system that was ever produced in any nation. There is no nation today that has an industrial system such as the United States of America has.

Another thing, England could never have become what she is today had it not been for the United States producing the stuff that was necessary to feed her people, in order that she might create her industrial system. Had it not been for the United States of America, Germany would never have started out in the creation of an industrial system, and why not? Because she could not feed her people. The United States is feeding them; Canada is feeding them. Australia is feeding the industrial hands that are working the system of England and Germany, and were it not for those countries, it would be impossible for Germany and England to maintain themselves.

Another thing; we have not only done that, but we have fed the people that created our own system and we have fed them with the cheapest kind of food. There is no other nation that can boast of an industrial system that has been created as cheaply as that of the United States; there is no such nation. Why not? Because we had cheap land, we could produce cheaply. There are men before me here this afternoon who passed through the time when they sold wheat for 50 cents a bushel. Didn't you? Certainly you did.

The SECRETARY: And corn for 20.

PROF. MENGES: Yes, that was the time when we made our industrial system. Do you know it? That was the time we built the railroads across the country. That was the time when Mr. James G. Hill started out to build that railroad through the Northwest and he is the greatest railroad pioneer in this nation today.

A Member: But we have no more of money now than we had with 50 cent wheat.

PROF. MENGES: I will let you discuss that, I won't talk about it. I say we created that system at that time. Now then, things have changed. Our industrial system is created; our railroad system is created. We had enough to eat through the process of creation, but the time has come when it looks as if we were not going to have enough to eat, and who is agitated by it? Why, the industrial system is agitated, the commercial system is agitated, the railroad system is agitated about it, and they want to know, what shall we do, and everybody wants to help us along, to do what? They are trying to get us to produce more, that's the thing that they want us to do, want to do what? To maintain conditions such as they are at the present time.

Now my friends, the maintenance of conditions such as they are at the present time depends entirely upon that farmer and upon nobody else. He is the one on whom it depends. Why is it that you have 23,000 acres less farming land today than you had in 1900? Simply because we have put a certain class of men into a position that they can pay better wages than you and I can pay, that's why. I said because we have put a certain class of men into a position that they can pay higher wages than you and I can pay. I need not go any further than my own county. I know what has happened there. The farms outside of York and some of the richest farming land in the State of Pennsylvania is lying there, and some of it, regardless of what some of you think about our farming, some of it, is not farmed at all. Why not? Because the men who farmed it can make two and three and four dollars a day working in the factories of York, whereas, if they would work on the farm, they could make a dollar or a dollar and a half or two dollars a day. Now my friends, you wouldn't think well of a fellow if he would say, "All right, I'll take the dollar fifty or two dollars a day, instead of four dollars a day down there in the factory where I work only ten hours, whereas, on your old farm I'd have to work from daylight till sunset and sometimes till nine or ten o'clock at night." I am not advocating those things, but that is the condition that is confronting us today. We must put that farmer into a position so that he can pay the same wages that are paid by any other organization or any other industry, and just as soon as you do that, just that soon you will get the fellows back to the farm.

A Member: That will bring down the prices of the products.

PROF.MENGES: Well, that is an entirely different question and I would like to handle that for a while, but haven't time this afternoon. Now I see where we are. I said the Farmers' Institute is the training school of these farmers of the State of Pennsylvania, and that Farmers' Institute lecturers of the future will have to be a great deal bigger men than we fellows are that are at it now, in order to give the kind of instruction that is needed to keep that man on the farm and make him a man that will produce the stuff that is needed, for what? For the purpose of feeding our industrial system, our transportation system, our mining system and our commercial system, and I don't like to include that last—I say I don't like to—I'm going to say something mean.

A Member: I wouldn't do it if I couldn't prove it.

PROF. MENGES: There never was a nation that was cursed with a commercial system of such unparalleled cussedness as the United States is. That's pretty strong, isn't it? Maybe you don't believe it.

A Member: Have witnesses to prove it?

PROF. MENGES: Now, my friends, I don't like to say a thing like that, it hurts me to say it and maybe I should not say it, but it looks to me as if somebody should say it, and I might just as well do it as somebody else, because maybe I can do it in a little pleasanter way.

Well now, don't you see where we are? That fellow, that Farmers' Institute lecturer in the future, must be a bigger man than he has ever been before. I don't know of any other institution, my friends, that can take its place. There isn't another institution that can take the place of the Farmers' Institute for the instruction of the farmer and for the purpose of reaching him. The Institute goes right to him. Now don't you see what is at stake? Our agriculture is at stake; our industrial system is at stake; our mining system is at stake; our transportation system is at stake, and our commercial system depends entirely upon that farmer.

Now, my Farmers' Institute friends, I have talked too long, but I wanted to get to a point, don't you see, where we are. You see what you need. Mr. Martin and the Secretary here are aware what is needed in the State of Pennsylvania, as well as I am, and there are a number of others here who know these things just as well as I do. The likelihood is that you have not expressed them in the way that I have. Now my friends, I look at it in this way, that it is through the agency of the Farmers' Institute, it is through the agency of the legislation that has recently been enacted by the Legislature, that it is possible for the Agricultural Department to take that farmer and put him into a position where he can maintain himself, where he can maintain our industrial system, where he can maintain our commercial system, where he can maintain the transportation system and where he can maintain the mining system of Pennsylvania, the greatest that exists today anywhere. Now you see, here is something for us to do and I hope that hereafter the Institute lecturers will feel their responsibility and that they will go out with a message that will take that farmer and lift him up to a higher standard than he has occupied heretofore.

DIRECTOR MARTIN: My friends, before we start upon the program proper, the clerk will distribute pencils and blanks for the purpose of giving the members and others an opportunity to write down such questions as may occur to them from time to time and make notes of lessons that may here be developed relative to the Institute work for the coming season. I may say, in addition, that we have assembled and are just entering upon the active work of our three days' meeting. It is a source of great gratification to listen to the addresses of welcome. We are certainly thankful for the generous hospitality extended to us in the opening sessions of this meeting. The programs have been distributed and they are here for anyone who desires them. They will be distributed from time to time, and if permitted, the suggestion is possibly in place now to the County Chairmen of Institutes and lecturers who are present, there is nothing that tends to the success of any meeting to a greater degree than promptness in all we do, promptness in attendance at the time set and regularity in that attendance. Our time is brief, our program is a full one, and, as we believe, replete with subject-matter that will not only interest the Convention proper, but we feel confident that the farmers and residents of this city will be interested in attending these meetings, to which they are entirely welcome.

This and subsequent roll-calls showed the following members present:—

## COUNTY INSTITUTE MANAGERS

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|---|---|
| A. I. Weidner, | Adams county. |
| A. J. Purdy, | Allegheny county. |
| S. S. Blyholder, | Armstrong county. |
| A. L. McKibben, | Beaver county. |
| W. F. Biddle, | Bedford county. |
| Howard G. McGowan, | Berks county. |
| W. Frank Beck, | Blair county. |
| B. F. Wambold, | Bucks county. |
| W. H. Milliron, | Butler county. |
| Lewis J. Bearer, | Cambria county. |
| M. E. Conard, | Carbon county. |
| Edward Lienhard, | Chester county. |
| Harrison Straw, | Clearfield county. |
| Joel A. Herr, | Clinton county. |
| A. P. Young, | Columbia county. |
| J. F. Seavy, | Crawford county. |
| Archie Billings, | Erie county. |
| John T. Smith, | Fayette county. |
| Frank Rauck, | Fulton county. |
| J. W. Stewart, | Greene county. |
| G. G. Hutchison, | Huntingdon county. |
| S. C. George, | Indiana county. |
| Peter B. Cowan, | Jefferson county. |
| Matthew Rodgers, | Juniata county. |
| Horace Seamans, | Lackawanna county. |
| J. Aldus Herr, | Lancaster county. |
| Sylvester Shaffer, | Lawrence county. |
| Edward Shuey, | Lebanon county. |
| J. E. Hildebrant, | Luzerne county. |
| W. C. Black, | Mercer county. |
| M. M. Naginey, | Mifflin county. |
| F. S. Brong, | Monroe county. |
| J. H. Schultz, | Montgomery county. |
| J. Miles Derr, | Montour county. |
| C. S. Messinger, | Northampton county. |
| I. A. Eschbach, | Northumberland county. |
| C. M. Bower, | Perry county. |
| A. T. Crittenden, | Potter county. |
| John Shoener, | Schuylkill county. |
| F. F. Glass, | Snyder county. |
| J. C. Weller, | Somerset county. |
| F. A. Davies, | Susquehanna county. |
| J. Newton Glover, | Union county. |
| W. A. Crawford, | Venango county. |
| G. A. Woodside, | Warren county. |
| D. S. Taylor, | Washington county. |
| W. F. Holtzer, | Westmoreland county. |
| George A. Benson, | Wyoming county. |
| G. F. Barnes, | York county. |

## INSTITUTE LECTURERS

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| J. T. Campbell, | Hartstown, Pa. |
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| W. Theo. Wittman, | Allentown, Pa. |
| R. J. Weld, | Sugargrove, Pa. |

The CHAIRMAN: The first topic, according to the program, is one of much interest to everyone. The topic is, "The Function of the Experiment Farms." We have with us today Dr. Charles E. Thorne, Director of the Ohio Experiment Station, of Wooster, Ohio. I have the pleasure of introducing Dr. Thorne.

Dr. Thorne's address is as follows:

## THE FUNCTION OF THE EXPERIMENT FARMS

By DR. CHAS. E. THORNE, *Director of the Ohio Experiment Station, Wooster, Ohio.*

I have been very much interested indeed in the discussion this afternoon. The questions that have been brought before you are certainly of very great importance. They are questions that we are realizing over in Ohio in a very forceful way. I am not acquainted with Pennsylvania conditions. I am acquainted with Ohio conditions and our statistics show that fifty years ago we were producing within a couple of bushels to the acre as much wheat and the same amount of corn, or probably a little more than we are producing now. We have been contented to stand for sixty years at a uniform rate of production, which amounts to an average income per acre of something like ten dollars at present prices; for the land under cultivation. Meanwhile, the rate of wages has gone up, until the situation now is that more than half of our Ohio farmers are earning less on their farms than they are paying the men who help them by the month. We have made a census of a township just over across the river in Ohio. wherein the income was carefully ascertained for the major portion of the farmers of that township. We find that 60 per cent. of the farmers of that township are actually earning less for their work than they are paying the men who help them by the month. A few are earning more than this, a few are earning from a dollar to a hundred dollars a year more, and a few are earning very comfortable wages, very comfortable livings from their work. To cultivate land which will only produce 12 or 14 bushels of wheat to the acre and 30 to 35 bushels of corn to the acre, means a scale of living too low for people who have the opportunity to look around them that our young people have in Ohio. The consequence is that these young people have left the farm and are going to the city. They have not always done better by going to the city, I trust, and yet the stream has constantly tended away from the farm and into the city, and largely because of the meager return which our Ohio farms, under the old system of Ohio farming, have been yielding.

We are up against the alternative of two propositions; our farms must yield more to the acre or our farmers will go back to the condition of the peasant farmers of Europe. There is no choice between these two positions—one or the other thing must happen—and it is because those whose vision has been above the ordinary level have been able to see this, that such institutions as the Experiment Stations have been established, for these conditions have not been confined to Ohio alone. You all know of the fact that in many sections of the Eastern United States farms have been sold for many years past at less than the cost of the improvements on them. Such conditions prevail in many parts of Ohio yet and prevail to a larger degree in some portions of New York and New England, and I say it is because those whose vision has been above that ordinary level have been able to realize this, that such institutions have been established.

These experiment stations have now demonstrated beyond all question that it is possible, by the application of scientific methods to agriculture, to enormously increase the production of the land; but what is the reception with which this demonstration meets? Some of you have seen in an eastern agricultural journal recently the complaint of farmers, that the experiment stations and the institute speakers and the teachers in the colleges of agriculture are trying to teach the farmers how to produce more to the acre when they already produce too much, because, whenever you get a good crop, it sells for less than a poor one. We know that is true and we know, also, those of us who look abroad, know that unless we do learn to make the acre produce more than it has done hitherto, the time is coming when our children or grandchildren will go hungry. There is no alternative between those two propositions. The acre must produce more than it is doing or the future generations will go hungry in our country as they have gone hungry and died by the millions of starvation in Asiastic countries; but the reception agricultural stations and lecturers and experiment stations are getting from many of the farmers is that the workers who are trying to show how this should be done, are parasites on the body politic, (you will see that within the last year or two), loafers—and we realize and have realized for years that in many cases our work is met in just that way.

It is not altogether a problem of showing how the thing is to be done; the problem is to get down to the farmer himself and overcome his inertia and show him the better way. We are cultivating parallel strips of land side by side over on the Experiment Farm at Wooster, a farm that had been rented for a quarter of a century before it came into our possession and had been at the tender mercies of the tenant farmer for that period. On one type of land, duplicated five or ten times over, we have been able to produce as an average, with the best cultivation we knew how, a thorough drainage to begin with and the best tillage we knew how to give, we have been able to produce an average of a little over ten bushels of wheat to the acre for ten years past, the land being farmed in rotation with the best tillage we knew how to give. Right alongside, separated by strips only two feet wide and just duplicated again in the same way, we have produced over thirty bushels of wheat to the acre, with the same tillage, the same seed and the same rotation, the same cultivation in every way, except that on the one hand we have left the land under the management which had prevailed before, and on the other hand we have applied the suggestions which modern science has given us in the feeding of the crops. In other words, our Ohio farmers are contented to travel over two or three acres of land, to seed two or three acres of land, to cultivate two or three acres of land, to get the produce of one acre, and they are doing that notwithstanding the information that has been put before them for at least ten years past, that a better method was possible.

We have about 272,000 farmers in Ohio, something over 60,000 of those farmers have asked for our Bulletins, the publications of the Experiment Station. The attitude of the other 200,000 farmers is fairly represented by the words of the young man in the streets of Wooster a year or two ago, when the College of Agriculture, which has no connection with the Experiment Station, when the College of Agriculture had come to Wooster with one of its movable schools of agriculture, the schools being held a week at a place in different sections of the State. Someone asked the young man if he was going to attend that school of agriculture. He replied, "No, I know more about farming in a week than them sapheads up at the Experiment Station does in a year." We have to meet this attitude of the farmers of our country, our friends and neighbors all around us, before we can accomplish the work that is before us.

How are we to meet his attitude? That is the question we have to answer, you and we, you Institute workers and the Institute workers in Ohio. We have been holding Farmers' Institutes in Ohio for thirty years; there nowhere circulates a better grade of agricultural press than in Ohio; there is nowhere a better college of agriculture than in Ohio, but with all this work, that is the attitude we have to meet, and it is sometimes an attitude that is almost discouraging to those engaged in the work. And before we can successfully reach these people, we must reach those whose heads are above the level, and fortunately, we have them everywhere in Pennsylvania and in Ohio both. Here and there we have one whose vision is wider, who can see farther than the majority, and to reach these is the problem that is set before us, to reach such as these the Legislatures of both States have established experiment stations under the patronage of the Federal Government, the object of these experiment stations being to work up and reduce to farming practice the principles by which the yield of the land might be increased and might be economically increased. We desire to increase the yield, if the expense of the increase does not outweigh the value of the increase, but that point must be kept before us all the time.

Thirty years ago the experiment station was established in Ohio. It was not long before we began to realize that an experiment station located on a single type of soil could not answer satisfactorily questions for other and different types. We began more than twenty years ago to reach out to establish auxiliary stations, test farms, we called them, not equipped with scientific laboratories and all that paraphernalia, but simply farms on which the problems of differences of soil constitution could be intelligently studied. This work has gone on, until the Ohio station now has some eight of such outlying farms. To illustrate the difference in the results which we obtain on these farms from the treatment of soil,—the main station at Wooster has produced an average net profit of $14 per acre for each five year rotation on crops grown in rotation and treated with fertilizing combinations. The same treatment on soil treated in the same way, both as to drainage and rotation and tillage, on a farm forty miles away, on a different kind of soil, has given us a net average profit of 64 cents. Now, you can see that if we had based—if our knowledge had been limited to the one farm on which we were located, what a different teaching we would have been giving to the people of the State than we must give with the knowledge that soils may be radically different in their condition. This led to the extension of these farms. As fast as possible they are being extended to include the principal soil types of the State. We do not expect, of course, to include every soil, but the principal soil types of the State are being brought under control in this way.

We first undertook to do this by the establishment of test fields, by co-operative work with farmers on the different soils. That seemed the rational way to go at it. It looked as if it would be a great deal cheaper to get a farmer to carry out under our instructions a particular test than to purchase a farm and equip it and maintain it for this purpose. The outcome was continually disappointing. The difficulty was that we did not succeed in finding farmers who were willing to set aside land for an indefinite period for such purposes. Our work soon showed that if this kind of research is to bear fruit of permanent value, it must be continued for a period of we know not how long in one place in order to accomplish results. To illustrate that point more clearly: In 1894, we harvested a crop of wheat on the main station farm at Wooster, that had been treated with various fertilizing materials. It was the first application of fertilizers to this tract. A number of the applications contained acid phosphate as a carrier of phosphorus. In every case where acid phosphate was used that year, the yield of wheat, of grain, was less than it was on the unfertilized land alongside, and yet, as we look back over the nineteen years that have elapsed since that experiment was begun, the average increase of wheat over this nineteen years has been nearly 28 bushels to the acre. You see what a terrible mix we would have made if we had stopped our test with that one experiment and based our recommendations to the farmers on that one point, and that is what is too often done, we are too apt to take a single test and jump at conclusions from that.

If our work at the Ohio Station has demonstrated one thing more than another, if it has demonstrated that one thing is of greater importance than any other, it is that this study of the soil must be continued through a long period of years, in order to overcome and equalize the variations due to seasonal differences. Take the first year's work out at Wooster, the first five years' work at Wooster, and compare it with the second five years, we find that the increase during the second five year period has been in many cases double, and some cases more than double what it was during the first five years. The explanation is easy. As we look back over the nineteen years now and study our results not only there, but at the six or eight other farms we have now under test, we find that invariably the application of fertilizers on land previously untreated fails to produce its full effect. The crops immediately fertilized never secure, never obtain, all the fertility given in this first application. From half to one-third, taking the average of all our work, from half to one-third of the effect of an application of fertilizers is carried forward to succeeding crops, and in the case of manures, the difference is still greater than that, so that you see, taking this part alone, it takes a long period of years to arrive at results which will serve as a safe guide from which to teach how to use these materials.

We have not found so great a difference in effect on different soils as these first ones I spoke of, in other cases, but we find that no two soils give exactly the same returns from fertilizer treatment, but that each soil must be studied by itself. Each crop has its own peculiarities, as I said this morning, every plant has its own likes and dislikes, its own aptitudes, and these must be studied, but the important variations are in the soils rather than in the plants, and we must study the soils; we cannot move them into our laboratories and analyze them there and tell what they need; that has been exploded long ago, and yet every week I have to answer letters, asking us to analyze soils. We have in Ohio, in Wooster, the soils that we are working on, in the upper 7 inches of soil, 18 and 20 tons of potash per acre, and yet on some of these soils so small an application as 20 pounds of potash carried in 40 tons of muriate has added four to five dollars an acre to the increase of crops. Soils that already had 18 to 20 tons to the acre, an addition of so little as 20 pounds to the acre has made that difference in the increase of yield of crops. The meaning simply is that the potash in our soils is locked up in such insoluble combinations that it yielded up too slowly for proper production, and even where there is already such a great store of potash, it pays to add a little available potash to the crops we grow.

The remark was made a little while ago—I am going back a moment—about the amount of land that lies idle here in Washington county. We in Ohio would be better off today, absolutely better off, if one-third of our land were lying absolutely idle and turned back to nature, and the energy we use in traveling over that land, trying to raise crops on land too wet or too poor for cultivation—I say if that were turned back to nature and the energy wasted on that land was expended in the improvement of other land—that is an important point.

**PROF. MENGES:** Is that done?

**DR. THORNE:** It is not done. That is the answer to those who say we are trying to teach them to grow more crops when they are already growing too much. If we could teach them to do better farming on fewer acres the outcome would be immensely better for our people.

I thought to give you a little idea of some of the points that are being worked out by this system of research farms. I was saying that we started out years ago with the idea of employing farmers to carry on this work for us. Farmers were not willing to set aside permanently land for this purpose. They were not willing to give up the land for a long enough period for results of value to be worked out of it. They were not willing to give it the care necessary; they were not willing to give the accurate weighing and measurement of crops that was necessary to accurate results. An illustration of what we encountered will be plain: We were testing varieties of wheat. We wanted to examine the behavior of these varieties on a very different soil from that at the main station. That soil is a yellow, sandy clay. We wanted to see whether there was any difference in varieties on black land, on the low, black prairie land we have in the western part of the State, and we sent samples of these wheats to one of the best farmers in that region, a young man, a college graduate, a man of very much more than average intelligence, a wealthy farmer, who had a large farm and who enthusiastically began the experiment. He carried it through nicely the first season. We induced him to repeat it the second season. He sowed the wheat, he raised it all right, he harvested it all right, but when thrashing time came, his hands were short and the weather was threatening and he rushed the whole thing through the thrashing machine together, so that when we got through we knew nothing.

Such experiences soon cured us of this method of trying to work. We found that the only way in which we, with our Ohio conditions—they are different there from what they are in Illinois and different, no doubt, from what they are in Pennsylvania, but with our Ohio conditions, the only way in which we could be sure of carrying an experiment to its completion and of getting from it results that would have any value when completed, was to have absolute control for an indefinite period of the land upon which the experiment was made, of the labor employed in making that experiment, and the only way to do this was to lease or purchase farms, to equip these farms with men and tools and implements, to have men on these farms who had no other responsibility than the execution of this work, whose wages depended on the faithfulness with which they carried out the orders given them, who had no interest whatever in the crop, who could afford to stand aside and let it be entirely destroyed, if necessary, rather than miss the experiment.

We had some bitter experiences on our farm, where we had things under, or as we thought, under control. We had a splendid crop of clover hay growing. It had been under fertilizers for several years and the results were very striking. We had also at the same time a ten acre field of magnificent clover hay, such as I described this morning. There were ten acres in one field and three in the other. Our farmer, who was one of the most faithful men we have in Ohio, could not help but be tempted by the ten acres of magnificent clover to cut that and harvest it first. He did so, then set in a period of rain. For three weeks it rained and when he got the three acres cut on the fertilized land, it had fallen down and taken second growth, while that on the unfertilized land continued to grow. He got less hay in every case off of the fertilized land than he did off of the unfertilized land, and yet there was no question at all before the hay went down that there was fifty per cent. more hay on the fertilized land than on the other. We lost our experiment completely. I told him I would rather he had simply burned the ten acres of hay that had no experiment in it than had lost the experiment. The experiment is the one thing that is of value, the crop is of no value whatever, and in order to carry out a scientific piece of work in that way, we have to be absolutely free from any financial interest in the matter. We must look only to the experiment, not to the value of the crop or the labor put on it, nothing else but working out the experiment, and the only way in which we can do that is to have absolute control of land and crop, men and teams.

A Member: Are those two farms self-sustaining?

DR. THORNE: They cost us two thousand dollars a year more than they bring in. If they were self-sustaining, they could not do the work we have for them to do; the work of weighing and measuring and account keeping must inevitably cost more. We must employ men of a higher grade than the ordinary day laborer and we must divorce that man absolutely from the work itself, from any interest in the work itself; we cannot crowd him; we cannot push him; we must have faithful work, and that means that he mustn't work from daylight till dark. he must not work to the point of physical exhaustion if he is to carry on the experimental work necessary to accomplish the results we are after.

I should say that in the organization of these farms we first leased a whole farm. We had leased the farm I first spoke of, where we only got 64 cents as against $14, at the Station, on a ten-year lease, with the option of purchase. The tobacco growers in southwestern Ohio were determined that we should take up the tobacco problem and in order to accomplish that we went into that region, and the Tobacco Growers' Association purchased a farm, paid cash for it and leased it for ten years with the option of taking it over in that time on payment of the purchase price and paying 6 per cent. annually for the lease. Since then a law has been passed in our State, authorizing counties in the State to purchase farms for experiment purposes and to place these farms under the management of the Experiment Station. We have, in the norhwestern part of the State, a great interest in the sugar beet industry, and we have a number of factories there and farmers are greatly interested in that industry. We cannot

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grow either tobacco or sugar beets on the main farm at Wooster. The soil is not adapted to either of those crops. We cannot grow them in a satisfactory way and one of the counties in the sugar beet region was the first to take up this County Experiment Farm Law and we have established a farm in that region where we are making the sugar beet the feature of our work. We wanted to study the country.

In southeastern Ohio, we have a great deal of farming land there that might be bought for a few dollars up to twenty-five or thirty or forty dollars an acre, and the best farms were not held at more than sixty dollars an acre. We were interested in studying the condition of those hill counties. We believed it was possible to do things which would alter the condition of agriculture and purchased a farm of 300 acres there. We are now using it for three purposes, largely for the study of sheep husbandry, and while the country is well adapted to pasture and not well adapted to agriculture or tillage; also the study of orchard conditions and forestry. Sheep husbandry involves the culture and development of pasture. We are making that farm a center of that kind of study.

To show what may be done by work of this character, we have a territory down in Washington county, our State, that was seventy-five years ago one of the great apple growing regions of Ohio and had been up to that time. It had been from the earliest settlement of the State. Marietta, you know, is one of the earliest towns settled in the State and apple growing was soon started there through the scattering of seeds by that historical character you have heard of, Johnny Appleseed. His work began in there and extended throughout the State, but that county grew apples and shipped them down the river before the Civil War in vast quatities. Their orchards for twenty years have been producing nothing and they began to cut them down. A few years ago our horticulturist went there and found an orchard that had been condemned to the axe. He got the owner to let him have an acre for that one season. The outcome was that the owner sold four hundred dollars' worth of apples from that acre, while the trees around it, thirty or forty acres, continued their former habits of producing nothing. Instead of cutting down the orchard, he went to work to take care of it and plant more trees and that county has sold a great many thousand dollars' worth of apples from that one experiment, and yet Mr. Greene, our horticulturist, had been telling, for nearly twenty years, what might be done in the orchard, but it had fallen on deaf ears. Now they are taking hold and carrying on the work.

The same thing holds in soil fertility work even more strongly than in such things as orchards. An apple orchard full of apples when the orchards all around are barren is a very striking object lesson. It is easier to develop such an object lesson because we can do that in two or three years' time. Such a question as that we can solve on leased or rented land or in co-operation.

As an illustration right there of that question of continued co-operation: The farmer in whose orchard this object lesson was given is not willing for it to be continued. Not only because he does not want to lose the income of those trees around him, but he wants the whole orchard treated and that does not leave us any measuring stick to show what may be done by treatment in that particular orchard, so we have to give that lesson up and start an orchard ourselves if we are going to make a permanent study of this question of orchard treatment. The shorter table here is intended to show the difference in results that we get on different soil formations. I will not take time to go over it. You will see that phosphorus on every soil has produced a profitable increase. We have not failed anywhere in Ohio to produce a profitable increase by the application of phosphorus on any soil that has been for twenty-five years or more in cultivation.

The meaning of that, after all, is simple; phosphorus is one of the main constituents of bone. Without phosphorus there is no life, animal or vegetable. It is found in the minutest organism, from the bacteria up to ourselves; there is no life without phosphorus.

Now in our system of agriculture over in Ohio we have been raising grain for nearly a hundred years. We dug a couple of canals across the State before the days of the railroad, in order that our grain might be carried to the Ohio River and then down the river, to feed the negroes in the South, the slaves, more quickly. Our farmers for twenty-five miles of those canals on either side hauled their wheat to the canals. Those were the first cash crops we had. Then the railroads came, elevators were established at every railroad station over the State, taking the corn and oats and carrying them out of the State. With the development of these means of transportation, the livestock industry grew less, more of our grain was shipped out of the State as grain, and I may say that but for the raising of livestock, we would not sustain such losses of phosphorus, for, as I say, phosphorus is one of the chief constituents of bone, and when we feed the grain to the livestock and drive it across the mountains to sell in Philadelphia, as my father did in the early days, or drive it down to Cincinnati in the form of hogs, to go from there to feed the slaves in the South, as we did before the War—I remember hog drivers stopping at my father's place before the railroads came, but with the coming of the railroads Ohio became a great livestock growing State, and with every trainload that went out, went a load of phosphorus. Milk is the characteristic food of the young animal and must contain phosphorus, and with the growth of our cities, the production of milk has increased enormously, so there is an enormous stream of this element flowing out of the State, and as far as we have been able to study from these soils scattered over the State, we have not yet found a foot of land in Ohio that has been twenty-five years or more under cultivation, that does not respond to the application of phosphorus; it is naturally the first thing to apply.

Over in Kentucky they have a substratum of rock under their Experiment Station in that famous blue grass region, which you have heard so much about, and unquestionably the notoriety of that region, its great value as a producing country, is largely owing to the fact of this phosphatic stratum underlying it. That region possibly reaches up into southern Ohio. We are finding evidence of more phosphorus in our southwestern Ohio soils than anywhere else, but phosphorus is not the only thing our plants consume; they must have potassium as well, and when we add potassium to our soils, we get a still further increase. When, however, we use potassium alone, though reinforcing it with phosphorus, or when we use potassium and nitrogen together, the yield drops off, and the net value, as shown in the bottom of the table, turns to a minus quantity. In other words, when you use the two elements alone, without the reinforcement of phosphorus, then your result is a loss instead of a gain.

Understand that I am speaking now of the cost of nitrogen and phosphorus and potassium and the ordinary commercial fertilizers, or such carriers as acid phosphate, nitrate of soda and muriate of potash. When we use the three combined, you will notice, the net gain at Wooster is greater than for any single partial application, whereas, in the other cases, you will notice the net gain has been larger when the nitrogen was left out. I want you to notice particularly this, that the total grain from these three elements has been in every case larger than from any other application of fertilizers, but when we come to apply nitrogen and nitrate of soda and potash—muriate of potash—the net gain is smaller in every case except one at Wooster; that means that nitrogen and nitrate of soda cost us too much to be used with economy as the only source of nitrogen for our crops, and potassium in muriate of potash costs us too much to be used as the only source of potash in our crops, but in barnyard manure we have a source of nitrogen and potash which is to be used in such a way as to greatly reduce the cost of these elements ,and in other experiments shown over here we have been doing that.

Now, let us turn to the larger chart (chart shown) and take up some of the points there drawn from our Wooster experiments, which have been longer continued than any except these, and strands of which represent a larger number of the soils of the State. The Strongville experiment seems to represent but a little area, while the Wooster experiment represents a larger area. You will see in the upper line the yield obtained in 18 years, as given on this table, and the annual value of the crop as shown in this column here, that is, in this years' rotation of corn, wheat, oats, clover and timothy sown together. The annual value of the crop has amounted to $10.65 per acre for the 18 years of the test. When we have added phosphate at the rate of the equivalent of 65 lbs. per acre for each of the five years the annual value of the crop has amounted to $14.05 per acre. The cost of the application has been 48 cents annually per acre, leaving us $2.92 per acre as a clear profit from the application. When we have added potash to that, the total value has reached $15.65, raising the net gain to $3.35. When we have added both potash and nitrogen, the total value has risen to $15.80 per acre and the net gain to $3.50. When we have used less nitrate of soda and more phosphorus, the net gain has risen to $4.20. On two plots in this series, we are using yard manure, at the rate of 4 tons each, on corn and wheat, and 8 tons each on corn and wheat in the other, this being ordinary open yard manure after being leached in the barnyard. If we value manure at 50 cents a ton, the manure has given us a net gain of $4.20 per acre from the 4 ton application; and from the 8-ton application, a net gain of $6.43 per acre.

I give you those figures in order to suggest the point that the value which you put upon the manure is an important factor in considering whether or not it is profitable to use it. If you get beyond $2.00 a ton in the valuation of the manure, you can fertilize with chemicals as cheaply or more cheaply than you can with manure, but if you count manure at simply the cost of hauling it from the barnyard to the field, there is no chemical combination that can compete with manure in its value; but I have said that the animals which produce this manure have taken out of the food they consume the phosphorus needed to build up their skeletons, and the result is that this manure is necessarily deficient in phosphorus.

In 1897, we began experiments at the Ohio Station, to study this point in the treatment of manure with phosphorus in the stables. The outcome of these experiments is given in the middle of this chart. You will see that the land without manure fertilizer, in three years' rotation of corn, wheat and clover, has produced an annual increase in total value of $12.35. Compare this with the $10.65 above; in other words, when clover has come in one year in three, instead of one year in five, the net yeild has been worth more than when the clover came oftener; we got $12.35 as the average annual value of the crop in this three-year rotation, where clover was grown every third year, as against $10.65 from a five-year rotation in which we had clover and timothy both, and oats besides, but when this land has been treated with 8 tons of manure applied to corn, the value of the crop has risen to $17.67, as a 14-year average, for open yard manure, given manure at 50 cents a ton, it gives us a net gain of $4.00 per acre in the next column to the last, while with the value of manure at $2.00, you see the net gain has been nothing. I hope I am making this clear.

I am going over it rather hastily and a little roughly, but I want to make that clear, that open yard manure applied at the rate of 8 tons per acre on corn in this three-year rotation of corn, wheat and clover, has given us no clear profit if we value the manure at $2.00 per ton and if we make no allowance to the manure for the effect that must follow on subsequent crops, taking the immediate effect of the manure. I want to impress upon you that the profit from manure depends upon the value you put on it. This is important, because over in our State many farmers are buying manure from town and hauling it out some distance from town, buying stock yard manure and having that shipped and unloading it and hauling it out to their farms. If the total cost of the manure exceeds this amount of $2.00 per ton, judging from these experiments at the Wooster Station, which have been going on now for fourteen years, and which give a larger effect from manure than most other experiments I have been able to find, I say if the manure laid down on your field is costing you more than $2.00 a ton, then begin to think of using either a better grade of manure or substitute fertilizers for the manure; but in these same experiments, we are using 8 tons of stall manure and fresh manure that has not been exposed to the weather, and it has been bringing us a net gain of $6.00 per acre, if valued at 50 cents a ton; or $2.00 per acre, if valued at $2.00 a ton; whereas the open yard manure fails to return any net gain at $2.00 a ton.

A Member: Do you count fresh manure the same as manure kept under a shed?

DR. THORNE: Yes, if it has not been allowed to heat or leach from the weather. Part of this manure has been phosphated in the stable, our rule being to scatter the phosphate, common acid phosphate, over the manure, at the rate of 1 lb. per 1000 lbs., the application being made daily or two or three times a week. There may be better quantities to use, but this is the arbitrary amount we have used, 1 lb. of common acid phosphate per 1000 lbs. animal per day. That has been our rule. We think a little more would be better. We are using acid treated manures and the raw flux, and both are giving us equivalent effects when used in this way in the stable, the same quantities.

A Member: For what purpose do you use that?

DR. THORNE: The object is twofold; it is, first, to reinforce the manure with phosphorus; for that purpose, either the raw rock or acid phosphate would seem to be equally useful. It is, second, to prevent the escape of ammonia; the sulphuric acid in the acid phosphate is the effective agent. We apply it for the conservation of ammonia and the reinforcemnt of phosphoric acid with phosphorus. The acidulated phosphoric acid will retain the ammonia better than the raw rock. We are using common gypsum in these experiments and it improves the manure enough to pay well for its cost, but it contains no phosphorus. We find that we get enough larger increase from using the phosphatic materials to make it unprofitable to use the gypsum even as a gift.

A Member: Does that improve the condition of the atmosphere?

DR. THORNE: We think so. I use it in my horse stable for that purpose. Another effect that the acid phosphate has that neither the floats nor the gypsum would have, or at least the floats would not have it, is that it reduces the fly nuisance. We are not yet able to say that we can control the fly nuisance by this treatment, but we are confident that it materially reduces the breeding of flies. We are confident that if we used more of it we could completely control the fly nuisance. A daily use of acid phosphate in the stables at a rate larger than I am speaking of would unquestionably reduce the fly nuisance.

A Member: Do I understand you correctly that you stated that twenty-five cents' worth of phosphoric acid to a ton of manure increased the value of the manure $9.68.

DR THORNE: Well, right here are the figures. You saw the stall manure phosphated has made a total increase to the value of $25.65, 8 tons of it, while the stall manure without the phosphorus has made an increase of $19.70; there is a difference of $5.00 for 8 tons of manure. Now, taking out the cost of treatment in both cases, the net gain is $6.02 for the stall manure without the phosphate and $10.17 for the stall manure with the phosphate; there is $4.00 for 8 tons of manure.

A Member: How is that, Doctor?

DR. THORNE: My own figures are a little confusing on that point right here. This is the net annual gain from 8 tons of manure distributed over three crops; the total gain from the 8 tons of manure would be three times as much as the difference between these figures; it would be $12.00 from the 8 tons of manure, which would be practically $1.50 a ton.

A Member: Is there any danger in using that acid?

DR THORNE: None whatever; on the contrary, we think it would be an advantage to the animals.

The SECRETARY: Let me suggest that those who ask questions speak loud enough to be heard by the reporter.

DR. THORNE: The question was whether there would be any danger to the animals, especially the animals' feet, from using acid phosphate. We have discovered no danger. We think the use of acid phosphate, especially in a horse stable, will be an advantage to the animals' eyes. I have seen horses' eyes injured where the ammonia was not allowed to escape and acid phosphate will reduce that injury.

PROF. MENGES: You say that unacidulated rock has the same effect?

DR. THORNE: No, it would not have the same effect in arresting ammonia.

The SECRETARY: The person who asks a question should speak out. Just forget for the time being that you are talking to Dr. Thorne and suppose that you are talking to somebody with his back toward you. After this meeting is over, we want this literature to go all over the State, and in order that everything shall be in proper condition, so that the reader can understand it, we want the question as well as the answer.

DR. THORNE: The question is whether raw rock would have the same effect in horse stables as the acid phosphate. Now that question we have put to a comparative test. The experiment described here has been made on cattle manure, which does not ferment so rapidly as horse manure, and we interpret our experiment as meaning this, probably, that for slow fermentation manures, where the main object is the reinforcement of the manures with phosphorus, that the raw rock will produce practically the same net effect as the acid phosphate. It does not produce as large a total effect, but it does not cost as much per ton; but the same amount of money expended in raw rock as in acid phosphate will produce practically the same amount of net gain as in acid phosphate; not in the case of cold manures, but in the case of stables which must be cleaned daily or in the case of horse stables; our reasoning is as the general outcome of our experiments, that the acid phosphate is the logical material to use, because of its greater effect in the arresting of escaping ammonia. It will make the stable sweeter than the floats will. It will do more to prevent the breeding of flies; it will catch more ammonia and hold it; it will reduce the fermentation and the heat to a greater extent than would the floats, so that our recommendation practically is to use the raw rock. The floats under steers or sheep that are being fed continuously, where the manure is trampled under foot and allowed to lie some weeks before it goes to the field, there the float has a long time in which to be acted upon by the manure and the results we are getting are very satisfactory, but for manure that must be handled daily our advice is to use the acid phosphate rather than the floats, believing that the outcome will be more satisfactory from the acid phosphate than the floats.

A Member: How often do you use it a week in a horse stable?

**DR. THORNE:** It is apt to be used daily in a horse stable. We do not, all of us, carry that out, but it ought to be used daily in a horse stable.

A Member: Is there any difference in the value of using it in the horse and cow stable?

**DR. THORNE:** We have not investigated, but I assume it would be even greater in the horse stable than in the cow stable, especially as to flies and the saving of ammonia.

A Member: If I understand you right, an investment of 25 cents brings a man $1.50?

**DR. THORNE:** That is correct.

**MR. HULL:** If the horse manure from horse stables is put into the gutter in the rear of the dairy herd, won't the cow manure arrest the escape of the ammonia;

**DR. THORNE:** To some extent it will, but if allowed to lie for any length of time, fermentation will set in and the ammonia will escape; therefore, we would even then recommend acid phosphate to arrest the escape of ammonia; the immediate escape of ammonia will be retarded, but eventually there will be an even greater loss than if the two were not mixed.

**MR. HULL:** When the horse manure is put out of the stable, the decomposition would be delayed?

**DR. THORNE:** Yes, but cow manure will set up fermentation after a while. It is simply slower in its fermentation than horse manure, and the incorporation of this material with that mixture will still further delay the fermentation more than if the phosphate is left out, but don't forget, after all, that the effect of this addition of phosphate is not merely to arrest fermentation, it is not merely to reduce the fly nuisance, but it is also, and that was the first object had in view, it is also to reinforce the manure in this element of phosphorus in which it is defective, and that is largely why we get the results we have.

Now the floats, so far as we know, the floats doesn't arrest any ammonia, or but very little, but it does reinforce the manure with phosphorus, and in our experiments, the floats is giving us in the field nearly the same effect we get from acid phosphate. If you figure experiments one way, it seems that the float is the more profitable to use on cold manure than acid phosphate, but there are three objects to be held in mind all the time, reinforcing the manure with phosphorus, the arrest of ammonia and the abating of the fly nuisance. Those three objects are all to be considered in this treatment.

**MR. WELD:** Here's one question; Why does it abate the fly nuisance?

**DR. THORNE:** Because the flies will not breed in manure where sulphuric acid is used.

**MR. WELD:** It destroys their eggs?

**DR. THORNE:** Yes, sir.

A Member: Suppose the manure is used every day from the stable; will it be as effective then?

**DR. THORNE:** It would be as effective in reinforcing it with phosphorus, it would be as effective in arresting ammonia, even more so; and as the fly nuisance, there would be the same thing to say. We think the acid phosphate would have just as large an effect in that case as where the manure is trampled under foot. Now your suggestion again is where manure is handled every day, whether horse or cow manure, where it is handled every day and dusted with phosphate at the time of handling, in order to reinforce it with phosphorus, in order to retard the escape of ammonia and in order to reduce the fly nuisance, but if allowed to lie under foot and be trampled for a period of time, then the float will perhaps be the best material to use. You can only purchase the floats to advantage in carloads, whereas you can get acid phosphate in any quantity you please, and the floats now are not on the market in smaller quantities than carloads, except at a prohibitive price. If you have to pay a high price, by all means buy acid phosphate.

Now the question whether all this work is of any avail depends upon whether the common farmer can apply it to his operations. As we have taken the farmers through our experiment fields, we have heard them saying: "Yes, you can do this because you have the State behind you, but we cannot afford to do it on our farms." They have said this with regard to all our work, and especially this work in the reinforcement of manure. The question came to us, and as I said this morning, we had on the Station farm a tract of forty acres that had been under a four-year rotation of corn, wheat, oats and clover for ten years past. This was in 1904. In this four-year rotation, the manure being applied from the barnyard, where it had lain exposed to the weather, at the rate of 8 or 10 tons to the acre, spread broadcast over the wheat before seeding, after ploughing in the oat stubble for wheat, our yield for ten years had been an average of 48 bushels of corn, 50 bushels of oats, 20 bushels of wheat and about a ton and three-quarters of clover hay.

We decided to test for our own Station whether these tests we had been studying—we had nearly a thousand of them—we had more than fifteen hundred—now these plots—I started to answer a different question—are distributed over different soil types. We wanted to see whether the results we were getting on these small plots running from 1-20th up to 1-10th of an acre each, were applicable to ordinary field conditions, so in 1904 we changed our system in this forty acre field and instead of letting the manure lie in the barnyard from spring until August, we put it directly on the land, after taking off the second crop of clover, on that clover field that was to be ploughed for corn next Spring, and instead of putting it through the barnyard we took it from the manure shed or stable direct and spread it over this field after having treated it with this phosphate material, treated it with floats in the stable or in the manure shed and then taken to the field and spread during the fall and early winter broadcast over the land with a manure spreader. Of course, at the same rate we had been previously using 8 or 10 tons at a ploughing under with corn; we had learned that we must lime that land before we could grow clover successfully; therefore, after ploughing under the manure we applied lime at the rate of a ton of burnt lime or two tons of brown limestone to the acre, and we have never been able to discover any practical difference between the two when applied in those proportions, because when you burn a ton of limestone you burn out half its weight, so you have the same amount of calcium in it as in the original stone. The corn was followed by the oats in regular system, the oats receiving no treatment. On the wheat we used a high grade complete commercial fertilizer, using 400 lbs. per acre of 4-16, 4-4 fertilizer.

The result has been that since this change was made our corn has averaged 73 bushels to the acre, instead of 48; our oats has risen from 50 to 60 bushels, our wheat from 20 to 33 bushels, our clover from 1 3-4 tons to over 3 tons per acre, and we would have had an average of considerably more if we had not, a time or two, bought common medium red and got Mammoth. The Mammoth gave us only one cutting and that no heavier than from the medium red, so it cut down our yeild considerably. Last Fall, from 10 acres of medium clover we harvested from the two cuttings 4 3-4 tons per acre on land that ten years ago was refusing to grow clover at all. The result has been an increase of about 25 bushels of corn to the acre; my figures would make it 26, the manure being the same as it was before; the phosphating of the manure cost us $1.60 an acre; the lime was figured at $6.00 the first time and half that since. The complete fertilizer we used cost $6.40 more, making $14. an acre. That we have paid out to get back 25 bushels of corn, 10 bushels of oats, 13 bushels of wheat and 1 1-4 tons of hay.

Have we come out or not? Is it a rich man's proposition or a poor man's proposition to treat land in this way? That is the question. I say if there is any man under heaven who can afford to neglect the use of manures and fertilizers, it is the rich man. The poor man is the last man under God's heaven who can afford to neglect these propositions.

The SECRETARY: Doctor, I thought you were going to give us in your figures the difference between manure spread as it comes from the stable after harvest on the ground that you are going to turn down for corn, and that taken up in the spring.

DR. THORNE: No, I cannot give that in exact figures. We have observed this, that the manure we first put on is the manure that gives you the largest crop and our farmers who are following the same practice corroborate us in that, but cannot give us any exact figures.

A Member: That which you manure in July is better for corn the next year?

DR. THORNE: Decidedly. We depend on eye evidence alone, but the eye evidence has been strong enough to make us safe in this assertion.

A Member: When you put the manure on, do you then cut the second crop.

DR. THORNE: We usually wait until after we have cut the second crop. If there isn't going to be any second crop, we would put it on after the first mowing, but usually we wait and take a second cutting.

A Member: That second crop, do you use it for hay or clover seed?

DR. THORNE: We have thus far used it for hay. There have been reasons for not using it for seed. In some cases we have not had the seed.

A Member: Does it make good hay?

DR. THORNE: Some of the best hay I have ever fed to my horses was second crop clover that I cut last fall.

A Member: Does it make them slobber?

DR. THORNE: Not a bit. They would leave their oats for this clover. There was a good deal of ousack in the first crop and a little in the second. It all depends, in our judgment, on the way it is handled.

A Member: Tell us how to handle it, because in Pennsylvania we have trouble with that.

DR. THORNE: You will have to govern the weather before we can tell you absolutely how to handle it; there is the point, it is a matter of weather and not of particular handling with us.

The SECRETARY: Or shop covers.

DR. THORNE: Yes, these shop covers are invaluable if you are growing alfalfa and very valuable for clover hay. I thank you for your attention.

The CHAIRMAN: This closes the program; are there any announcements?

(Director Martin called attention to the Evening Session and read the program for same).

DIRECTOR MARTIN: This is an important session, one in which both persons living in the city and the country are unquestionably interested. We shall hope and expect a full audience for this Evening Session at half past seven.

The SECRETARY: Before we adjourn, with Mr. Martin's consent, I would like to make a suggestion. I notice that some of the members, when they are asked questions, will move from one place to another, and I see that the reporter has some trouble in following after you, in order to put himself in a position where he can hear all that is going on. Now, if it be agreeable, I would like to suggest that the speakers will stay right in their places, then the reporter can get near and put himself in a position so that he can hear the questions and the answers. I think it will make our report more complete. Excuse me for interrupting.

MR. MARTIN: That's a good suggestion. Usually, at a meeting of this kind and character, where there is a call for a Committee on Resolutions, as has been our custom, we will appoint three gentlemen who will compose this Committee: Prof. Menges, of York; Mr. Schultz, of Montgomery, and Dr. Conard, of Chester, who will compose this Committee on Resolutions.

The CHAIRMAN: Before adjourning, ladies and gentlemen, when you have the time, we wish you to visit as much of this little city as you can, especially our temple of justice, and in that Court House, on the third floor, you will find a collection of the Washingon County Historical Society. About the only time you can get in there, I presume, would be in the morning before the convening of the sessions here, or at the noon hour. I think there is a lady in attendance there all the time to show you around. I don't know when this is closed, but I wish you all to take a view of that. It is on the third floor of the Court House. We now stand adjourned until 7:30 this evening.

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Tuesday Evening, May 20, 1913, 7.30. P. M.

## WOMEN'S SESSION

Mrs. Martha E. Martin, President, in the Chair.

The CHAIRMAN: This is the first time that I remember that the Ladies' Session came in the forepart of the week's meetings, and I think it is nothing but right that Mr. Martin put us forward and had our session come earlier. I never attended any of the sessions in the General Assembly when they were voting on any of the questions of Woman Suffrage, and am not quite in sympathy with them, but I do feel there is one thing that the men can do alone without the ladies, and that is to vote. The first subject on our program this evening is "The Farm House," by Mrs. Mary T. Monroe, of Dryden, New York.

Mrs. Monroe spoke as follows:

## THE FARM HOUSE

By MRS. MARY T. MONROE, *Dryden, N. Y.*

As I listened this afternoon to facts about counties in Pennsylvania, I learned that Lancaster was the best county in the State, that Washington was the best county in the State, that York was the best county in the State, and I presume, that if there had been more speakers from different counties, there would have been other best counties in the State and in the world. I was reminded of what Dean Cook once said—you know he has been here talking at Institutes, he is at the head of one of the Agricultural schools in New York State, the one at Canton, and he said he liked to hear a man stand up for his own state and stand up for his own county and stand up for his own family and stand up for his own wife, even if he had to lie just a little bit to do it. And so I was glad to hear the remarks of the various speakers, and, as I listened further, do you know I made up my mind that those wonderful tales were true, which is the worst of it, and I thought of what Mark Twain said: He said that he had an awful dream one night, a terrible dream, his hair stood on end and cold chills went up and down his back, and he dreamed that his wife was pounding him over the head with a pillow and he got more frightened, and finally after one energetic whack, he awoke and found it was true. And so I thought probably these stories were all true—the worst of it was, they were true.

I want to call your attention to-night to a new factor in the Farmers' Institute work and get you to thinking about it in a new way, and I refer to the farmers' house, the farm residence. We have been giving a new kind of attention for many years to schoolhouses and we have better buildings. We have been giving a new kind of attention to churches and we have better churches, I suppose, better ventilation, better air. We have improved highways, even in New York State. We have improved means of communication all over the country, but very little has been done to improve the farmer's house, itself. Too many farm houses are poorly equipped for doing the work that has to be done in them. All hotels seek for labor-saving devices to lessen the work, to save strength and in this way to save money. The farmer himself buys improved machinery and performs his work by new methods in order to save time and save in that way, money.

In a little village in New York State—I don't know whether you can see it in Pennsylvania or not, I have seen the Standard Oil wagons going around drawn by two or sometimes four great horses delivering oil, and I said to myself and to a friend, "Why don't they carry that on the railroad or by other communications between these villages?" And do you know I found that the Standard Oil Company could save a few cents by delivering their oil by teams rather than on the railroad. Well, now, if it were worth while for the Standard Oil Company to save, it is worth while for the farmer to save money by having new and improved methods of doing the work in his own house. I think in time and strength the greatest leak is found in our homes and the lack of these labor saving devices keeps a woman trudging around a house day in and day out doing work that she might accomplish very quickly if she had the proper machinery to save her time for life in the open.

Farming is getting to be looked upon as a business system. We have had up to now business men and farmers—not the same thing at all; but farming now is a business and like any other business, it has a center. Now the center of the farming business is the farm residence, and when we strike at the farm home, the farm house, we strike at the very center of our rural life, and it is just as much a problem to reorganize the house itself as it is to reorganize the farm itself. I think men are as much interested in the carrying out of the operations of household labor as are the women. They ought to be, because they have to pay the bills, generally, and they are generally willing to add to the comfort of the house and the beauty of it as well as its cares.

There was a suffragette, that made an arrangement with her husband that she should attend whatever business he had once a week and he should stay at home and take care of he children and mind the house. Well, the first time she went to this meeting, whatever it was, he staid home willingly, but she was very anxious and hurried home from the meeting and John met her at the door. She said, "How did it go? Did you have any trouble with the children? Did you get them to bed all right? Did you have any trouble with them?" "Oh, no," he replied, "that little red headed boy did bother me a little, and finally I had to shut him up in the bedroom before he'd go to sleep, but it's all right now." "But John, we haven't got any red-headed child; that's Willie Smith, from next door."

It is time for men to commence to take some little thought of the inside of their houses. The farm houses in New York, and I fancy, Pennsylvania, were built a good many years ago, and the older ones were adapted to a kind of farming that is rapidly going out of fashion. Many of our older houses in New York State are gradually tumbling to pieces. Of course many farm houses are all that could be expected or could be desired; but within forty years most of the old farm houses must be either torn down and re-built or remodeled, and it is very important that when we do remodel our farm houses, that we do not follow the old lines of construction. I do not mean that a farmer must remodel his farm house until he can afford it, but my point is that as fast as the farm houses are reconstructed or re-built, certain new features shall be incorporated in them. I do not mean, either, that the farmer must build expensively, a cheap house may serve its purpose in the class to which it belongs just as well as an expensive one, but I do think that when you make it over, it is just as easy to make it convenient.

A familiar type of house, I think, to most of us, is the long upright with a wing, the kitchen at one end and the living room at the farther end, with perhaps a cellar. The kitchen is the only part of such a house that is warm in winter, so that the living is nearly all concentrated in the kitchen or one or two rooms adjoining it, and a rambling type of house lacks the concentration necessary in the middle-class house of the present day. There are several things that make it necessary to change the style of the house. One of these is the introduction in our farm houses of water works, and another is the difficulty, in New York State at least, of securing household help— we cannot get any in New York. Another is the expense of heating; that doesn't apply here very much, because you have coal oil and hot air. Many other changes are noticeable. One is the removal of the carrying of the milk from a house, so that makes a great change and a new type of house is quite as essential as the house itself. Of course the type needs as much remodeling as the farm house.

There has been a tendency in recent years when city men come out and go to farming, to build a farm house of the same style as the city house, a house that is very narrow and high. In the city this is a necessity, but it is very awkward and unsightly in the open country and entails much unnecessary running up and down stairs.

Now you see we might profitably change the type of our farm houses. Everything changes. A man who was a farmer was asked by one of you Institute men why he did not change his method of farming. He said, "My method of farming is good enough for me; that's the way my father and my grandfather farmed." "Well, if your father was a Democrat, would you be a Democrat?" "Yes, I'd be a Democrat." "If your father was a thief, what would you be?" "I'd be a Republican."

Now, by way of getting this before us, I will make a few concrete suggestions, and these suggestions will apply to common farm houses rather than the estates of country gentlemen. A farm residence should fit the farm. Country land is cheap—well, not on Long Island, I will except Long Island. Household labor is very high priced and hard to get. The house should be broad and long rather than narrow and tall. We need a type of farm architecture that seems to grow out of farming conditions; that is, the farm house must look like a farm house, not like a city house. It should be very simple in its construction and plans. This is true of all houses, but particularly of country houses. The farm house should be condensed as possible and the house should be ,on this account, planned to save to the very utmost. It must be remembered that a farm residence is a working place, and the kitchen and dining room and wood shed and cellar should all be within reach of one another, and so far as possible those rooms which are daily used, together, should be on the same floor and without any step up or down between them. This saves very much time and strength on the part of the house-wife.

We have not appreciated in the past that women's steps mean a loss of strength, and, therefore loss of money, and we should, therefore, plan our house so that the women's steps will be saved for other activities than just simply the drudgery of housework. How many do you suppose a woman takes in preparing a meal for a good sized family, four or five? that's a good big family in these days. Considering that 5,280 feet make a mile and that a woman prepares about a thousand meals a year, wouldn't you nearly circumnavigate the globe? And I think she'd have a lot better time. There's a whole lot of things a woman can have in an ordinary kitchen that she can make herself or that her husband or brother can make for her. They won't cost much and will be a pleasure to her.

This question of money in the house is a serious one. Do you know I think there's hardly a man here that realizes how badly a woman needs money, and I don't think one of you know what she does with it. Do you know there were two men that were bachelors and they were great friends. One of them got married and the first time they met after Mike was married, Bill says: "Mike, how do you like being married?" "Oh," says Mike, "I don't like it, I don't like it at all." "Why not?" "Oh, it's my wife; she wants money in the morning and money at noon and money at night; it's money, money, money." "What does she do with all this money?" "I don't know," says Mike, "I aint give her none yet."

Now the simplest thing, first, I think of, is a high stool on which a woman can sit and do a good deal of household work, wash dishes and peel potatoes at the kitchen sink and do a whole lot of things. Another thing is a hinge shelf near the kitchen sink, one that drops down out of place when not in use. Some houses might have a dumb waiter or, in the pantry, a shelf. If there is a cellar under the pantry, a shelf with the bottom taken out and wire meash put in for the bottom of the shelf right over the cellar. That makes a cold box. On the same line, another convenience is a window cupboard, if you can spare a window, take it for a window cupboard on the outside of your house. Put a dry goods box on brackets, make it the color of your house and have it the size of the lower sash. Put some wire screen over it for ventilation and have some shelves in it. I could make it myself with a stone for a hammer and any old bent nails. I can do good work with a stone and bent nails, and if you have that window cupboard, when you have a few things left over to be used for the next meal, a pitcher of cream to go on the table again, or a plate of butter that has not been mussed, tuck it in there. Draw a little curtain over the lower sash to hide it from the inside of your kitchen.

Many farmers buy supplies in large quantities, a barrel of sugar, a barrel of flour, and they are very hard things to move and sweep under; have a little platform with castors on it, such as they move stoves on in hardware houses—any man can make that, I am sure and put your barrel on that little platform and it can be moved from point to point. A zinc covered table is a splendid thing and you can cut down on a piece of zinc with a good sharp knife and it won't dull it much, not as much as to cut on wood. A zinc covered table can be made by any handy man and used to advantage in most of our kitchens. Then another thing—a clock in the kitchen is a great convenience. There is one thing about it—I hope that no matter what time the other clocks in the house may be, you will always set you kitchen clock exactly with your husband's watch. It might happen to be right, you know, but anyway, keep it with his watch, it will save you a lot of trouble. Another thing—a pair of scissors in the kitchen to cut salads and bacon rind and everything, and have such a handy place to put them that anyone would rather put them there than anywhere else. Another thing is a fireless cooker. For fifteen years I have used one that I made myself, and it is about as convenient and saved as much heat and steam and fuss about my kitchen as any other thing I could mention.

Well, with all those things in mind, a house then should be planned so it can be easily cleaned. That means an absence of all filigree work and jim-cracks and spindle work and upholstered furniture and hangings and curtains of various kinds and useless furnishings and eccentric corners. Did you ever see a den in the house? How many houses do you know that have what is called a den? Haven't you, in your own house, a den? What is a den? A den is where the broken chairs, the rugs with holes, the pictures cracked, the table packed, a tickless clock, desk that won't lock, are gathered in a heap by Ma and put into a room for Pa. That's about what the den is in our house, too.

Now that we are appreciating the relations between health and dust, the germs that lurk in dust, we feel differently about the construction and furnishings of our houses. We use now a liquid to dust with. You can make your own, make a preparation yourself, that will be cheap and handy and I really think works better than the bottled preparation. The one I use I adapted—I won't say I stole it, but I accidentally got hold of it from a man who tuned my piano and he always left it in such fine shape after he tuned it, those little finger marks all rubbed off, and I found out what it was, it was equal parts of sweet oil and turpentine and alcohol and water, a tablespoonful of each. Keep it well shaken up; just take a little cloth you can hold in your hand, not much larger than your hand, and saturate it with this preparation so it won't leave streaks when you wipe off your furniture, and it is splendid.

Another thing is a crack filler. So many houses might be easier cared for if the carpets were taken up and taken out of the houses, but those ugly cracks! There are cracks in the floors of the old farm house I went into when I was married, as thick as my hand. I used to make a crack filler that was very hard work; I boiled newspapers in paste,—it took a long while—with a little alum in it. but I discarded that. At one time I was in Waverly, New York State, and after I had told them how to make this complicated crack filler, a man got up and said, "I know how to make a better one." I asked him to tell me how and he did it. He said that when he built a house, if there were any cracks that needed filling, he took some Binghampton plaster, a fiber plaster, and wet it with water and spread it in the cracks, and I said, "How long will this last?" He replied, "Oh, it will last till I get off the job." But now I have a better one than that even and that is the simplest, and do you know when you get down to one that really works, it is always one that is very simple? Take some flour paste, flour boiled in water, and thicken it with plaster of Paris. Don't do very much at a time, because the plaster Paris hardens. That can be spread in any broken place on the plastering. You know when you tear off the old paper how many holes develop around where the rockers and chairs have gouged out the plaster and where the door knobs went in the wall. Just fill in those places with these materials, and it is just as nice and will save you the expense of getting a plasterer there.

Now friends, that house could be re-modeled with an idea of applying power to some part for the household work. There are many little engines on the market that generate power. There is one, I cannot remember the name of it, that can be used to pump the water, to churn, to separate the milk, to run the washing machine or the ironing concern. It has a generator that generates enough electricity so that twenty lights will burn in the hose for eighteen hours. That is a very common thing now and it is very handy. I was at a farm not long ago where the man was boasting of his conveniences at the barn. He had an engine going to pump the water for his cows and horses and pigs. He was feeling very lofty because he was going to get a bigger engine and do the same thing for his children. Do you know that was poor business. That man had to sell his little engine because it was not large enough to pump the water and do the work for the barn. He had to sell that engine at a loss. If he had borrowed money and paid interest on it and brought an engine of the right size in the first place, he would be money ahead; but I am glad he is going to pump it up into the house, anyway. We have been applying power to the operations of the farm work at the barn for a long time ,but not to any great extent in the house. Every modern house ought to have water running in it and out of it and I hope that within twenty-five years all of our better farm residences and may of our tenant houses will have better water facilities, and it seems to me that as long as the farmer can secure his water without a water tax or without being subject to a water board as they have in town, he ought to control the situation very much as he wishes. Of course in some farm houses it would be possible to get a supply for the house by having your system at the top of your house, but will you tell me where the advantage is in letting rain water down into a tank at the bottom of the house and then pumping it up again into a tank at the top of a house? Why not let it run into a tank at the top of the house in the first place and then distribute it? It will be just as good water.

When we have water in a house, we can put in some system of sewerage. There are many tanks costing about five dollars that will actually take care of all the waste of the farmer's house, allow him to have a bath room, inside toilet room and water at the kitchen sink at low expense, if he can get the water in the house.

The ordinary farm house further should be planned in such a way that the members of the family can do the house work, not depend on servants, and I am not sure that in many cases it will be possible to reduce the housekeeping labor by a quarter, perhaps a third, if the plan is studied with that view in mind. Do you know that most of the unexpected visitors come to the side door or the back door, because the woman and others are at work in the rear of the house? There may be no servant, and it seems to me that our secondary and back doors should be much more attractive than at present, and that will result in a house that is attractive all the way around. I think it will come to mean that when we can do away with this old outside closet, disfiguring, unsightly, unsanitary and many of the old buildings and sheds that have come later—it will mean that the back of our house is as highly developed as the front or it will face all ways and have no back yard. The house ought to be provided with ample storing facilities. Very often large quantities of various things are put down for winter. Many times this place might be better on the first floor. Ordinary they are kept in the cellar or in the garret, and this place also should be large enough to keep not only the fruits and vegetables and other supplies to be sold, but the jellies and pickles and other supplies of the house. In this day of woman's work, so many farmer's daughters are making jellies and jams and pickles and one thing and another to sell and have a nice tidy sum in the bank to show after it, and such a storeroom would be very nice for that.

The first floor and the cellar are the center of the family's activities. The members of the family spend much of their time out of doors, and this means that the first floor should not be approached by a high flight of steps, and also that the wash room and other service rooms should be on this floor and of easy access and preferably near the farm side entrance so that the men from the farm will not be obliged to run through the house in order to reach their conveniences. When additions are placed on the old farm house, care should be taken to make them match in appearance and style the original house. It is very common to find box corniced houses with queer looking porches on them, chicken leg style and with queer jim-cracks, even if the original house was a dignified sort of a house. These, if left to the whim of the ordinary carpenter, are apt to look unsuitable and jimcrack work on the outside of a house is poor policy, because it is the first thing to go to pieces, and when you come to paint it, it takes more paint and more time to put the paint on, and when it gets shabby, it does look very much worse.

I want you to think about this change in the farm house. I don't expect it will come at once or for sometime, but get a new picture of home in your mind; a building stands not a day, but year in and year out, and its influence is greater than any of us is aware of. A house is built of bricks and stones, of wood and beams and piers; a home is built of loving deeds that last a thousand years. A house, though but a humble cot, within its walls may hold a home of priceless beauty, rich in love's eternal gold. The men of earth build homes with pillars, walls and domes; the women of the earth, God knows the women build the home.

The CHAIRMAN: Next on the program is Dr. A. Holmes, Dean of the General Faculty, State College, Pa., who will speak on "The Country Boy." It is reported that he has not arrived. The next subject will be "Home Making a Science" by Dr. Hannah McK Lyons.

Dr. Lyons delivered the following address:

## HOME MAKING A SCIENCE

By DR. HANNAH McK. LYONS, *Ceres, Pennsylvania Grange, Lincoln University, Pa.*

I suppose we have no object before us greater than home making, and when we begin to put the two together, home making and science, we wonder if they do really fit together, and I don't believe there's a home maker in Pennsylvania—well, perhaps there may be some who are in the Grange and are getting up to date, but I wonder if there are very many home makers in Pennsylvania who believe that any science belongs with their home making. In the old days you went to a temperance meeting and you heard a great many things; but today you don't hear the same things, you hear the scientific side of the subject and you stand aghast at the truths that are told you. Again, the mother sends her boy to College, and, to the inquiring neighbor who asks after him, as she throws her head up a little and her shoulders straighten, she says, "Yes, Thomas is having the Scientific course at College," and then in a few moments she turns to her kitchen and the droop comes again to her shoulders and she goes about her work and says, "It's drudgery for me; my boy may have science, but it's just drudgery at home." Never for a moment does she realize that she has the greatest laboratory in the country in her own home, in her own kitchen. Recently I heard an educator say, one of our prominent ones in Pennsylvania, that the greatest thing in this country was education, and then he went on to say that the schools were the most important and so on.

Great as I believe our schools are, and I grant him all he said, at the same time, ahead of that I would put the home and the home makers of our State—yes, of our country. You notice that I have not said the housekeepers. I believe there is a great difference between the housekeeper and the home maker, and yet the homemaker is always a good housekeeper: You have seen just as I have seen, and I well remember in my first days away from home, when I was out in the business world, as you would say, and I was boarding, how the husband came into the kitchen and the dining room, but he had to be careful how he sat down in the parlor, and the young boy just coming into his teens—and how my heart has gone out again and again to that boy who became a little wayward, yes, a little more than a little—he didn't dare come in the parlor; and so I would not have my homemaker the kind of a housekeeper that James Whitcomb Riley tells us about, who believed that she was entirely right with her neatness and her overcarefulness, and yet her husband found the old balky horse at the stable and the old cat better company that his wife; and so I would not have our homemaker that kind of a housekeeper.

Today home making is becoming complicated, more complicated than it ever has been. In the great business world they have planned their systems of transportation until foods from all over the world are brought in our markets at home. And what is true of the foods is true also of the fabrics that we use for clothing, and so I say home making today is more complicated that it was in the old days when, from the farm and garden, the table was supplied. It was an entirely different task to prepare them; it was entirely a different task to dress the family when the hand loom furnished all the clothing for the home and the styles of this year were the styles of next year. But today, with the numerous fabrics coming, our home dress maker has to determine which is best for her family, and just as we heard this evening, the house that is fit for the city is not the house for the farm, so the clothing that is worn in the cities is not the clothing for the country. Just the other day a friend was talking to me, telling me of a Vassar graduate who had come into our county and I had heard her spoken of in regard to some work and then we thought she was not succeeding and my friend said: "Yes, but do you know what she it doing? She's a pastor's wife; she has a large class of girls in her school, a school gathered up from a country district; she not only teaches them the lesson on Sunday morning, but she is teaching those girls how to dress in the country, teaching them the proper thing to wear and the proper way to wear it."

But I was speaking of food. It is a task today to go into the market and choose your foods, choose the thing that is suitable for your family, so that you will have your meal well balanced, so that you have nutritious food, at the same time that you have a variety and so that it is pleasing in appearance, because they tell us that the pleasing part is an appetizer. When our housewife undertakes to plan her meal, does she realize that then her science is coming play? Well, ask her where. She can't understand; she doesn't understand, herself. I have thought sometimes when we served our meat and potatoes together and when we looked back and realized that our grandmothers served the same things together and when we know, those of us who are studying these questions, that meat alone does not give the proper food value, and that potatoes alone does not give the proper food value, but that we combine them and nearly always serve them together, I think there must have been a blind instinct in the early days for serving those two and serving many other of our foods together. But today our scientific housekeeper knows why she serves them together, and I believe if our girls could be taught to know a little of the why and wherefore of these things, why they serve such and such things together, why they cook them so and so, why boiling water goes on a cereal, or why cold water goes on something else, that we would find that more of our girls would stay at home and be home-makers and help in the home rather than by going out into the business world, which, after all, they tire of after a little while. When our housekeeper understands that she applies heat to this because she is going to get more food value and more nutrition out of it, that she applies cold to something else because she will make it more appetizing and gain a greater food value, then I believe will she begin to learn the value of herself and her work and not feel the drudgery that she has.

I think if there is one thing the Grange is doing—and I can't leave the Grange out always in this home making— I believe if there is one thing the Grange is doing more than another, it is helping the women of our country find themselves. The farmer—a long time ago a great many things were done for him. He must be taught to raise better crops; he was the head of the home and the money maker. But we know today that the wife is the money maker just as much as the farmer is the money maker. If she doesn't plow the field and harvest the crop, she produces the meal that brings efficiency, and she saves the money in the home. When she prepares a meal that gives nutrition, that gives working power when he goes out to his work and finds that he has the strength and the ability to work, that his brain is clear and his nerves quiet and not all on a go, as I heard someone say not long ago, because his dinner was not digested right, that man is better able for his work, better able to cope with the business world, and so I want to ask you if that well prepared meal is not a financial asset in the home, and if she knows more of scientific methods that will make the meal more scientific. I don't mean, when I say scientific, that little poem that the boys give us sometimes about scientific cooking, but I mean the real, real, science, when she brings in the food nutritious as well as looking all right.

Then again when our purses are so light, if she knows how to substitute when eggs and meat and various things in the market are at the very highest price, if she knows the things to substitute and yet keep up nutrition, yet keep up her balance that she needs on her table, when she knows how to cook the cheaper cuts of meat and make them just as nutritious and palatable as a Porterhouse steak, is that not a financial asset? About this time of year, well, during

April and May down in our part of the State, we have the Susquehanna herring and we think, as they come along at this time of the year, they are somewhat of a delicacy, and about a year ago I remember our women had a very practical lesson, a sad one, on combinations. Sickness came in one of the homes. A boy—oh, you know boys when they get just to the age when appetite demands a quantity of everything, and this boy had eaten his supper and was taken very sick. The physician was called. He was very ill indeed; in fact, death was the result. A little later the old physician who attended him said, and it just leaked out all over the neighborhood, that it was fish and milk for supper. Now I have thought about that. You know sometimes we prepare fish with milk, but just note it is the kind of fish and that herring and milk don't go very well together, and so today, if you come into that section of the country, you will find that a mother never, when herring is her supper dish, permits her children to have milk also in quantities, and it is important to see that she knew these things.

I said a while ago that our home making was becoming more complicated, and if it is becoming more complicated, of course she needs more knowledge. But you say she is at the age when she cannot go to school. No, but her daughters may; and I would like to bring the message to you tonight that, if you have a daughter, let her have domestic science (shall we call it?) and I wonder if one of you, as you send your daughter off for domestic science, will straighten up and say with pride, "Mary is having a course in domestic science," as you said sometime ago when your neighbor inquired about Edward and you answered, "Yes, Edward is taking the scientific course." I have heard, I think I could count on my fingers, the mothers who have said, "Yes, we are letting Mary have a course in domestic science;" and then, in a half apology, she tells you why. I want to ask you, why not give her the scientific course in home making? Now, domestic science does not mean just cooking. Let us get away from that. Why not give her a course in scientific home making? You give her a course in music; she must have that. You say, "Yes, but I can teach her all the home making she needs at home. I can cook a meal fit for my people to eat, fit for anyone to eat and can teach her to do it." But I am afraid that many times you teach her the drudgery side of it and not the side that gives the uplift. And then, as I said, the work is becoming more complicated, there's all these foods, there's all the dress fabrics coming into our country and these are to be worked among and thought among until we find the very best for our conditions.

We have our great sanitary systems and in our homes our water systems and our sewerage systems; still our woman in the home needs to have a nose educated to sewer gas. Last winter I came over from West Chester one day, couldn't make the train home in the evening and had to stop in one of our boroughs in the city. As I went into a home that night between ten and eleven o'clock, having 'phoned ahead, an odor met me that made me wonder if I would be able to stay in the house all night, and yet the home maker in that home did not recognize it at all and for sometime I was at a loss myself to know where it came from or what it was, but it was nothing, friends, but sewer gas from the bath room, and there was enough in that home that night to have poisoned the two little boys who slept in the room just next. I was able to close my door and open the windows to the outside. And so our home makers today in very many of our homes, and as we heard a little while ago, in twenty-five years perhaps every home will need to have a nose educated to sewer gas if her family is going to be healthful. Our home maker needs to learn to value herself.

The day is almost past when the home maker is going to be pushed in the back ground. So frequently we have seen it, both with the husband and the growing children, how the mother would be pushed back and pushed back and pushed back, not their fault but her own fault, too often, because she permitted it. She simply kept things going smooth and comfortable and never for once brought herself to the front. But that day is almost past and she must learn to value herself if she is going to be the home maker.

I like to think of a home as being launched. When we launch our ships we make a great deal of talk about it and we christen them and name them and send them off over the waters. When we launch a home, how much more important it is that we should christen that home, that we should name it, that we should have our Captain well instructed in making that home, in the duties that are before her, and then her efforts, her work is going to return someday; just as the ship goes off over the waters, so our home makers and the work of the home goes off over the sea of life and after a time it is coming back into port and I wonder what the cargo is she'll bring?

When I think of this, there comes to my mind the story that is told of the Roman seamen who were sent off. Four of them were going off. There was a dreadful famine in that country and they had hoped, as they went off in their vessel, to come back with each vessel laden with the best of grain for the famine stricken people, and just as they were ready to sail, a message came and the messenger said to the captain of the ship: "When you return, you must bring sand;" and the captain's head dropped and he was sorry for the message, but it was the orders and he said, "Very well, when I come back I will bring sand." And so the message went to the second and the third captain of the ships, and alike they all dropped their heads, but it was orders and they said, "When we come back, we will bring sand." And again the messenger went to the fourth captain and gave the orders. He thought for a moment and then, straightening up as we expect of the true man, the true farmer, there came to his mind a picture of the starving people of the City of Rome; he thought of the mothers with the starving babies in their arms and the little children crying for food, and he looked in the messenger's eyes and he said: "I am sorry, but you take back this message, that my life belongs to our Ruler, but when I come back with my good ship, I will bring her loaded to the edge with the very best wheat that the country produces."

And so, friends, when our home maker sails off over Life's sea, I am anxious that she be prepared for the very best, and that when she comes into port, she will bring the very best that there is in life, and then will she have done her whole duty, not alone for the little cottage and the little home or the little community wherein she lived, but she will have done it for this big State of ours of which we are so proud, because, while we grant our men that their masterpiece is the State, we claim for the woman that her masterpiece is the home.

The CHAIRMAN: Is Dr. Holmes in the audience? If not, we will proceed with the program. Next in order is "Woman's Share in the Farm Partnership," by Mrs. H. B. Fullerton.

Mrs. Fullerton spoke as follows:

## WOMEN'S SHARE IN THE FARM PARTNERSHIP

By MRS. H. B. FULLERTON, *Milford, Long Island.*

Madam Chairman and Friends: I think I will have to make a little remark before I start in this story. Mrs. Monroe said that land was cheap everywhere but on Long Island. I come from Long Island, in fact I was born on Long Island and I have three children who were born there. Long Island is Paradise and no one expects Paradise to be cheap.

I am very sorry indeed that I have no lantern tonight, because I have with me about 50 colored slides that I wanted to show you on this story of the woman's share in the farm partnership; but as the lantern is not here, I will have to do the best I can to tell you the little story that the pictures could tell you so much better than I can tell it. I was once asked to respond to a toast. "What is the wife's share of the husband's dollar?" And I promptly responded, "Fifty cents."

The woman's share in the farm partnership is just 50 per cent., because, while one's partner may be silent—and usually I'm the silent partner in our partnership—when you hear Mr. Fullerton, tomorrow night, you will know why. I own 50 per cent. of stock just the same. A home cannot be made without a partnership, and I have seen some very beautiful partnerships where they were not of the husband and wife, although that is of course the ideal partnership. I've seen a farm partnership of father and daughters; I've seen a farm partnership of brothers and sisters, of sisters alone. of brothers alone of mother and sons; but the ideal partnership is of the husband and wife. We always look to that for the ideal home.

We will start on the outside of the home and see where the wife can do a great deal—or the woman, I will say. because it is not always the wife—in making that farm partnership pay. Let us take a farm home that is new or very old and run down, and the very first thing that the woman wants to do is to beautify it. She comes into the farm partnership with the aesthetic sense more highly developed than most men. You notice I don't say all men. Her intuition, as a rule, is much more keenly developed than a man's and she may be able to get a picture of what that home should be or how to make it, better than a man can.

I would like to tell you of a few things that can be done in a short space of time to make the outside of that home beautiful. I think poppies are about as easily grown, and will grow in as many different kinds of soil as almost any flower that grows, and a five cent package of poppies will transform one portion of the home grounds. Vines will do more than anything else to cover up the old home and make the new home look old. Maybe you think I'm queer in wanting a new home to look old, but if there is anything I detest, it is a newly new house; it's just like newly weds, it shines all over. You know there never was a bride and groom in the world that wanted anybody to suspect that they were bride and groom; they want everybody to think they've been married a dozen years. Wild cucumber grows very readily from seed and will climb 40 to 50 feet in a single season. It has white blossoms and an interesting seed pod. It will sow its own seed and become a volunteer the following season.

If you have the children's Christmas tree from last year and it has not been burned up for fire wood, plant it out in your garden and make it blossom. We had a very interesting time one year when we first moved from the city to the country. We planted the children's Christmas tree in the garden and one of our neighbors looked over the fence, knowing that we were greenhorns, said, "Mr. Fullerton, do you think that's going to grow?" "Certainly, of course it's going to grow and be in full blossom the middle of the season;" and the neighbor turned away and told all the neighbors that we certainly were greenhorns. We planted nasturtiums around the base of that Christmas tree and it was in bloom all summer. The coursadea are extremely good to plant also; their blossom looks as though made of Japanese crepe paper; the leaves are large and not too close together so that the air can pass through them and cool your porch without shutting out all the breezes.

If you want to be extremely utilitarian, you can plant cantaloupes on your front porch. As I say, I am sorry you cannot see the pictures of these things. I could show you a picture of cantaloupes on the front porch with about 50 to the vine. It is utilitarian and beautiful at the same time. Copious scandans is a beautiful vine that has a purple trumpet-shaped flower. The blossoms opens a very pale green and turns irridiscent colors to a very dark purple. Carry that up under your porch and underneath the inside of the roofing on a fishnet or rope or anything of that kind. The blossoms will come out in the middle of winter under the porch when the vine is totally dead. We have gathered it under the front porch on Christmas day. Honeysuckle is good to have around the place, but I wouldn't have it planted around the porch because it is so dense that it will shut out the wind. I don't think any farm is complete without honeysuckle.

These vines I speak of now from honeysuckle on, are what are called permanent, that is when they are planted once, they are good forever. In all your garden work, plant for the future, not things that are going to require so much care every single season. Wistaria is one of the most beautiful vines we have, but don't put it on your buildings, it is too strong. I have seen it break iron pillars in two, it's crushing force is tremendous; but if you have in your grounds a tree that is dead or dying and that you are thinking about cutting down, don't do it; just cut off the limbs so it will be safe and plant wistaria around it, and if your wistaria blossoms in the Spring and you wish, after two or three years, cut off all the seed pods and it will blossom again; you can have two sets of blossoms every year.

The climbing roses have come to us within the last few years and have brought the most marvelous wealth of blossoms and beautiful foliage. I believe the most hardy is the Perkins. It is extremely hardy and grows with us on Long Island fifteen feet in a season. The gardenia is one of the most fragrant and one of the most delightful of the climbing roses in the yellows, in fact I think it is the most beautiful yellow blooming rose. It is also very hardy, with a wonderful red tint to the young shoots. The wild clematis (clematis vitalva) you may be able to gather around your woods here. That's the only name I know for it, friends, or I wouldn't give it to you, but it is the feathery white wild clematis and makes a most beautiful flower.

If it is a possible thing for you to have a summer house on your grounds, have it, make it of any common tree that grows in your woods, it doesn't have to be made out of planed or be expensive at all, but it is one of the most delightful places for the woman partner to go to on a hot day and prepare her vegetables and fruits for canning. I have a summer house in which I have prepared many, many quarts of produce for winter use. It is covered with clematis. Go to the woods and bring in the ferns from the shady spots, any of the wild flowers that grow in your fields, bring them home and they will multiply and repay you a thousand fold. On Long Island we have miles and miles of sand violets, one of the most beautiful sights in the world. Start with some of the hardy shrubs, like lilacs and Japanese snow balls and things of that kind, one at a time, and one or two each year, and let me tell you how to multiply those so that your cost is going to be extremely small and yet your place will be growing in beauty all the time. In the Spring you have often noticed around the lilac bush the little shrubs coming up all around the main stem. That is not good for the bush, the more that come out, the less blossoms you will have in your main plant, but each stalk is a new plant. Run down a sharp knife and cut it off with its little roots and set it out in your garden and you will have as many lilac bushes as you plant shoots of that main stalk. Chyrsanthemums multiply very fast. Iris or the flour de lis multiplies with tremendous rapidity. Three years ago we had many iris plants and three years ago I cut off the hands of each one of these hands is a new plant and I now have, after four years, the original 24 plants so large that I cannot get my arms around them, and 500 new plants.

Nearly all of your things can be sub-divided in that way. Nearly all the hardy shrubs send out shoots and if you set them out, even if they do not all grow, you are gaining something.

The chicken yard is the bone of contention on the farm. If there are any prospective farm partnerships in this audience that have not become full partners yet, do let me ask to have this put in the marriage service; when the man says, "I will promise to love, honor and cherish," have him say, "I promise to love, honor and keep the chickens shut up," and there won't be any more trouble as far as chickens are concerned. You know it is very much easier for the farmer to have the chickens shut up where they belong than have them running all over the garden; and there have been more squabbles about the chickens digging up the flowers, I guess, than any other point in farm life.

Possibly you have a tree that must come down and is not suitable for wistaria. See if it cannot be cut off about the heighth of a chair, then cut off again a little lower, half way through, to make a charming seat for the farmer's wife to sit on in the afternoon when she has to go out to do some mending, which is always with her. Let the welcome of this farm begin at the gate and not the front door. If it is possible to have an old-fashioned border from your front gate to your front door, it will be one of the greatest joys you can possibly have in your farm garden, and that can be made of these permanent flowers that come up year after year and will give you very little trouble. I have one 800 feet long. It is the greatest joy we have on our farm and when everything has gone crooked and we are thoroughly tired, we walk down our 800 feet of flowers and come back perfectly rested. That border has flowers in it of all sorts, from the earliest croecus to the last chrysanthemum, and there is never a day in the growing season when there it not something blooming in it; in fact I said this Spring, when the tulips were in blossom, that it was positively intoxicating and I had to keep away.

There is one thing we cannot afford to be without, either member of the farm partnership, and that is a bird bath, so that the birds will have water. Birds will consume more insects than we can hope to kill with sprays; but birds will not build unless they have water near where they make their nest. A very simple bird bath is made of an old stump with a quarter inch pipe running through it and a gas tip on the end. If you have a bird bath, you will have birds by the hundreds and thousands nesting with you and eating the bugs which are so hard for us to control. It is also the greatest kind of a joy for every member of the family, old and young, to see the birds come in their season. They become pets and get very, very tame indeed.

All this work in the garden is helping you to have flowers in the house in the winter and I doubt if there is a farmer who objects to his wife's house flowers. To come in on a snowy day, when you have been out in the cold, wrestling with the chores, into a house full of house flowers strikes the right note in every man, whether he speaks it out loud or not. There's a lot of men that don't speak those notes out loud, and perhaps it would be a very wise idea for them to do it.

I expect you think this is all very aesthetic and I have given you the very delightful part of the farm partnership. Would any of you go without it? Would any of you go without dessert? I think a whole lot of you would rather have dessert than dinner, and I have given you dessert first.

Now I am going to give you dinner. There is so much that a wife can do on the farm that it is really surprising, unless we stop and think what it may be. She can start the blowing up of stumps with dynamite. I have done it so I know. She could be a tremendous help in clearing land, as far as that part is concerned, and save a great many steps. When it comes to the tying up of young plants, either for the greenhouse or for the cold frames, she is a tremendous help because a woman's fingers, as a rule, work very much faster than a man's. I know it is said in textile work that where the fingers are to be used a woman is much more valuable than a man because of the rapidity with which her fingers move. Potting tomatoes has come to be a very great industry, because it forwards the tomatoes about three weeks. They are put into a paper pot, put back into the cold frame, kept cooled off so they won't grow too spindling, and when the proper season comes, set right out in the field and never know they have been moved. Tomato vines that have flower or fruit set can be put into the field and not checked at all. In bunching rhubarb, she is certainly a great help. Bunching radishes is a tedious task and one that requires care. I don't know whether you have market gardens very much around here or not, but on Long Island, which is New York's garden, we have the market gardens, because we feed the great city, and the packing of the vegetables is a very important part of the farm work, and a woman's keen sense comes in there, not only because she is able to select and size up, but because she has the artistic sense, and you all know that a package artistically packed will sell for a great deal higher price than one not artistically packed.

If you are here tomorrow night, any of you, Mr. Fullerton will have the lantern and will show you the package we are shipping on Long Island, that has become a National factor. It is called the Long Island Home hamper. It is a crate holding 6-4 quart baskets in two tiers; in each basket is placed a different vegetable, and it is shipped from the farm at six o'clock in the morning and sent direct to the consumer, reaching there at noon, and the orders are so great that they simply cannot be filled. It's a mail order business, and every hamper that goes out is fit for a king. Each basket and the entire crates are lined with parafine paper, and the packing of these vegetables is a big business, and one in which a woman is most eminently fitted to help along. For instance the bunching of carrots—you know that a quarter of an acre of young bunched carrots is worth about three acres of horse carrots; fruit—all kinds or fruits, a woman is very dexterous in packing and in wrapping, and the day is going to come when our Eastern fruits will be packed as carefully and made up as beautifully as the Western fruits are today; in fact we have packed strawberries faced up exactly like California cherries, and that very facing has brought double the price that an ordinarily packed quart of strawberries would bring.

Tomatoes are now shipped in crates, and a little story goes along with that. We were shipping tomatoes by the bushel and receiving for them three cents less than the package cost! Profitable! The more tomatos we shipped, the poorer we got. We went into the big markets in the city to discover why, and we found that tomatoes. were bringing 14 cents a bushel in crates, that is the crates were bringing 14 cents a bushel, and what tomatoes were not tomato catsup, were being sold. A bushel of tomatoes weighs considerable, and after it has traveled and been hauled over the cobble stones of New York a good deal, it's tomato catsup; so we packed our tomatoes in baskets, six baskets to the crate, and every tomato was perfect and polished and the commission man said there was no use trying to sell them because this was a different package from the standard New York package. So we walked around the district, wading through tomato catsup, saw tomatoes in bushel crates everywhere and went back to the commission merchant and asked to see our tomatoes, and he asked the clerk, "Where are those tomatoes that came from the Long Island experiment station?" "It's a funny thing, I sold those." That wasn't the answer that was expected, because he couldn't sell them. We finally asked what he sold them for and found that he got $1.50 for a little over half a bushel, instead of 14 cents a bushel. Therefore tomatoes from the experiment station are always packed in crates.

Possibly some of you are farming on such lines that you have no fruit; that's a very poor thing, because we all should have our own fruit to put away in the Summer for the Winter, it is one of the necessary elements for growing children and we can have more fruit, if we can't have standard fruit, the dwarf fruit trees can be planted six feet apart each way and will bear the third year—apples pears, plums, figs, cherries, peaches. We have a daughter fourteen who intercropped in those trees when she was eleven and made enough to pay for all the trees cost her to plant, cultivate and spray the first year and had eight dollars to the good. This is the third year; she is now fourteen and her trees are coming into bearing and she has made a profit from her land every year since. We can have our fruit trees as part of our landscape architecture if we want to, because the pruning is so simple that anyone can take care of it if the farmer is too busy to be bothered with fruit, because of his other various duties. When it comes to the selection of seed corn, we women can select it just as well as a man can. It is no small task to select seed corn; it is a big task. Chickens seem to be our own special prerogative, possibly because the mothering instinct is more highly developed in most women than it is in most men, and the little chickens require the greatest care. Butter making, as a rule, is conceded to us, and if we can help along in the farm partnership, if we can help along the farm itself to a higher degree of perfection through any of the things we can do, we are entitled to 50 per cent. of the stock in that company. I had the pleasure this year of winning the gold medal at our State Fair for butter, with a score of 99½. I am sure that counted in the farm partnership. When it comes to preserves and canning the summer goods for winter use, that is certainly our own, and did you ever stop to think what it means for a woman to can what a family needs for an entire winter? I don't believe it has ever been put very forcibly to you. There is a saying that we sell what we can and what we can't we can. We have changed that a little bit, because everything goes into glass jars. We sell the best and jar the rest, because we sell nothing that is not perfect because we find that it pays. One summer I was privileged to put into glass what was not perfect on a ten acre market garden with small fruits and one acre of large fruit, and when I had finished my summer's work, I had 5,500 vessels full of eats, and those sold at retail for 25 cents a jar for jelly and as high as 90 cents a jar for some of the fruit. Well, that looks almost as though the by-product was worth more than the manufactory, doesn't it?

A woman's divine right is to sew. She should know, she has the divine right to know how to sew and to cook and preserve and clean and take care of children, and a man has the divine right to know how to carpenter and to paint and to plumb and to lay cement and take care of children. And I think that's a partnership.

The CHAIRMAN: In the absence of Dr. Holmes, we will call on Mr. Seeds to talk on the Country Blacksmith, if he pleases.

Mr. SEEDS: Mrs. Chairman, Ladies and Gentlemen: I want to say if there is any session that I would willingly take part in, if I have to take part in a session, it's a woman's session, because I'm related to the women. My mother was a woman and I have had the good fortune to get one for a wife. And while I don't know what I am going to say, when I look at this program that we have tonight and hear about the farm home and the farm boy and every thing except the farm girl, I don't know which of these subjects to take up.

I want to cover them all and I want to say that you can muster together a hundred people and they won't look at the home alike. It depends altogether on how you look at it and what you get out of it, and what I mean by that is that I can put my hand on the shoulders of people who live longer in twenty-five years than other people would live if they should never die. All because they get close to the life worth living, and I know they talk about me doing things that I ought not to do, but I want to tell you that I am not going to change my way of living and my way of getting something out of life as I try to get it out of it, and it depends altogether on how you look at a thing.

Last winter when I lectured at Falls City, Neb., I landed there just before supper time and went out to the wash room to wash my hands. A man followed me from the office out to the wash room, and when I was washing in one bowl, he was pretending to wash in another. He was a perfect stranger to me and after a while he looked up to me and said, "I tell you, I got a good one yesterday." Now why didn't he tell that to somebody else? But he told it to me and I said, "What's that?" "Why," he said, "there was a man up here in Lincoln, Neb., moving from one part of the city to the other part of it, and he had an old family clock that stood in the corner, that had been handed down for generations, that he valued highly, and he did not want to trust that clock in the hands of the drayman to take it across the city to his new home, so that man picked that old Grandfather's clock up and carried it across the City of Lincoln, and it was heavy and every now and then he had to put the clock down and rest, and a drunken man watched him carrying that clock across the city and he followed him, and followed him, and he noticed that he had to put the clock down and rest, and once when he put the clock down, the drunken man went up to him and said, 'Say, Mister, if I were you, I'd buy myself a watch.'"

Now it depends altogether on how you look at a thing; but when you talk about the home and the boy and the girl, you are getting down to the material that is gilt edged and has a gold stripe on every side of it, and I want to tell you, my dear friends of Washington county, that right across the line here—you talk about the home—I lectured at Oakdale this winter a year ago, and a man took me out in the afternoon to the Industrial home of Oakdale where they have about 400 convicted boys, where men of Western Pennsylvania have gone down in their pockets and brought up money and didn't say, "If you put up one half, I will put up the other half, but they will put up the money and they bought a 300 acre farm right at your door out here and when a boy is arrested in the juvenile court and convicted, those hands that brought up the money part the veil and say, "Give me the boy," and they take him out here to Oakdale where there is no fence around the 300 acre farm, no high wall, until they have 400 boys, convicted boys, and listen to me—there never has been a boy ran away from that Institution that did not turn around and come back of his own accord, because he has a square deal and is surrounded by a life that is worth living, and there, within your doors, there are 400 boys that come from 400 homes in this country, that are not right—that's the truth of it.

Now, what can be done to make those homes right? I tell you that I have traveled from one end of this country to the other and there are people trying to solve problems in this country that they don't know anything about; and across the border, in the great State of Ohio, there are 11,000 applications for divorces, seeking the right and the privilege to wipe out 11,000 homes in that State. And I want to tell you that I have tried to get next to this problem, and I want to tell you that a girl hasn't any right to get married until she can cook a good meal or boss the job. She hasn't any right to get married until she can make a bed as neat and as nice as she can put up her hair, and tuck the covers in around the foot of the bed so a man's feet wont come out.

A young couple got married in Chicago and the young man didn't have much of a salary, and couldn't put a cook in the kitchen, and this young wife of his stepped into the kitchen to cook for that young man and couldn't cook a little bit. One day he came home and she'd cooked some doughnuts, and she knew they were not good, and when they sat down to the dinner table, she looked across at her young husband and said: "Harry, can you suggest anytihng that will make my doughnuts better?" Harry said, "Yes, my dear, make the holes larger."

And I want to tell you another thing, the trouble with the homes of this country is that the father and the mother don't take the children into partnership with them. And do you know, I think the saddest thing I know of or the saddest thing I see or come across, is where the relatives, including the children, take the old man out to the cemetery and plant him and can't wait till they get back to the house to see what the will says. I have seen that all right. They won't do that with me, I tell you that right now.

MR. HUTCHISON: I'll see that you are buried, Bob.

MR. SEEDS: When I made my will, Mr. Hutchison, I sat down to the table, I didn't go and lock it up, when I made my will, I sat down to the table when Josephine was nine years of age and read my will to my family, and that girl never told a word that was in it, not on your life she didn't, and I want to tell you one thing, talk about the home as you please, all the bouquet that I want, all the reward or honor I ask in this world is that when the race of life is run and I trot under the wire for the last time, is for my family to go to the sculptor and say: "Here lies Bob Seeds, he was good to his folks." That's all I've got to live for. I've got two girls and I thank God from the bottom of my heart, if I would never get home those two girls can go out in the world and make a living, and they can cook a meal, and they are both going to Europe four weeks from today, and so far they haven't asked the old man for a dollar.

A Member: That's the part you like.

**MR. SEEDS:** That's right, you bet your life, that's what I'm proud of; that's why I know that if anything happens to me, they can go out into the world today and make a living and dress themselves without having a dollar left them, and that's what I am trying to do with my boys, and the trouble with my boys—I've got four of them—you talk about the boy in the home—the trouble is that when I educate that boy and send him away from home, I can't keep him away from home. I had one up in the mountain in the coal office for four years; he came home on the first of April to stay. Now I think that's all right, I don't find any fault with it. And then another thing is in that home and around this building, you have got in that home to get away from the drudgery. I tell you I like to dress up once in a while and look nice and all that kind of business, and we must get away from the drudgery, get what you want for the least possible price around the home.

I went home last summer and got to attending to the chickens and got to carrying the water for Mary's chickens and ducks. I didn't carry the water for the chickens and ducks very long, before I realized that to give those chickens and ducks all the water they wanted, it took about a barrel. Well, that's all right. I got to thinking at night and thinking when I hadn't anything else to do, you've got to learn to think you know, and today we don't carry a drop of water in the winter or summer for a duck or chicken, and they can't waste it, and can't make the pen wet or anything else. I say, "Behave yourself, there's the water," and they obey me and that saves a lot of trouble. Now they had a self feeder, it would last about a week and I wouldn't have to do a thing but gather the eggs and have the pen to clean. Now that's the way I try to get at it, and I want to tell you that that's my principle around this home. I have been lecturing on "How God made the soil fertile" for—how long?

**DIRECTOR MARTIN:** Oh, twenty-four years.

**MR. SEEDS:** Well, I don't know how long. Dr. Thorne said things on the platform this afternoon, at Seaman's Grove they were going to kill me for saying things like that twelve or fifteen years ago. The whole thing is to get away with the drudgery, and how I would like, from a religious and scientific standpoint, to see how man should make the money and have something after this expense is paid that the lady talked about here a while ago, that her daughter has left—it's the left part of it that cuts the figure, it is the $8 that is left that cuts the figure to the daughter; and a while ago I made up my mind that if I had my farm in alfalfa and it cost money to send men and boys out and bring in the alfalfa, so I said I'm going to have hogs to go out and bring it in, but last year the hog cholera struck me and I lost a thousand dollars, that's the other side of it, but we saved 40 out of the wreck by innoculation and we have 200 or 300 hogs now and I expect to have 500 or 600 again the first of October. If we are right in believing that they are immune, I want to tell you that that thousand dollars is money well spent; and when my friend, Charlie Warfield, who runs the Ward House at Tyrone, tells me that two years ago he had hog cholera and there—I was trying to fix something up that I was going to say a little bit later on, and I guess that's the way I made that mistake. Well, his hogs had the hog cholera—I guess that will do all right—and he has a mother down there right now, there stands a mother that was innoculated two years ago, with little pigs at her side and they died all around and other mothers died that had not been innoculated and this mother that was innoculated lives and her pigs live. If we can do that and know that we are right, it is money well spent.

Now these are the things that go to make up this home. I have always tried to take sunshine into my home and God only knows I try to live at home the way I talk about living at home when I am away from home. That's what I want to say. I want to tell you I have always tried to take sunshine into my home; I've carried that sunshine back that I have talked about for years and I am going to keep on carrying it and my family catches it, and I want to tell you that's the way to live and that's the way to have this home, and I want to tell you my dear friends, that you can't buy it with money.

I thank God from the bottom of my heart every twenty minutes that you can't buy happiness and health with money. I wouldn't give my stomach for old John D. Rockefeller's and all the millions he's got. Why John D. would give millions of dollars to be able to say what the poor tramp said who begged the loaf of bread from the lady at the kitchen door and put the loaf under his arm and started down the street. The loaf worked around and worked around until after a while it fell to the ground and a dog ran up and got it, and down the street the dog went with the loaf of bread, and the hungry man looked after the dog and said, "All right, take it and thank the Lord you haven't got my appetite." John D. Rockefeller would give millions to be able to say what that tramp said.

Talking about sunshine in the home and making the home like it ought to be, the National Stockman has had the picture of Bod Seeds' barnyard in their paper, and another paper took the photograph last week off the back of my buildings, and I am going to name it, not $3.15, but 15 cents and 3 dollars; it took a bushel of lime and two days work to change the whole face of that property. Does it pay? Why of course it pays. That's why you can't get the boys and girls to leave this home on the farm. It's the greatest place in the world to live, out on the farm, and then the only thing is to get that farm so that it pays and get something for your trouble, because I want to tell you that you've got to have some money, and it is what you've got left without being worn out and going through lots of drudgery to get it.

Now I guess I've talked long enough, Mrs. Chairman. I don't know what else I can say along this line. These things are close to my heart, and I want to tell you that last winter I lectured at Binghampton, New York at a winter Chautauqua, and a learned man came all the way from Boston to talk about the boy scouts, and got up and said that the boy scouts would take another boy and blindfold him and put him on a freight train, and if he could get back, he could join the boy scouts; then he talked about the boys' running away from home. Why, you couldn't make me believe that in a thirty day argument. I want to tell you there never was a boy or a dog that ran away from home when they had a square deal, never in the world. Never in the world would he run away from home if he's got a square deal, so let's make this home and let's make it like it ought to be and it's no use spending a lot of mony. Lots of people don't think anything about that, but I do and when I'm away, if anything comes into my home that creates a laugh, they will save it till I get home.

Not long ago I went home and sat down to the table to eat my first meal, and one of the little boys looked up at me and said: "Papa, if you would turn the X-ray on a dog's lung, what would you see?" Well, I scratched my head a while, and finally had to give up, and I turned around to the little fellow and said, "I don't know; what would you see?" "Well," he replied, "papa, if you would turn the X rays on a dog's lungs you would see the seat of his pants." Now that little boy came to me with that. I was going down Chestnut Street, Philadelphia, last winter a year ago, and a man came up to me and pulled my coat, a perfect stranger, and said, "Seeds, I'd like to ask you a question." "What do you want to ask me now?" "What's worse than finding a worm in an apple?" I said, "Finding two worms." "No, that won't do." I said, "If finding two worms is not worse than finding one worm, I don't know; I'll give it up. What *is* worse than finding a worm in an apple." He said, "Finding half a worm."

I can go into any man's home and sit down at the table with him and with a smile on my face eat mush and milk with him and relish it if he has a mortgage to pay, but I would like to go from one end of this country to the other and cut some stocking strings I know of and take out enough money to put a bath room in every house from the Atlantic to the Pacific. You ought to take a bath every Spring and Fall, whether you need it or not. An old duffer went down to Philadelphia and went to the Bingham House, and the only room he could get was one with a bath in it; so he got the room with the bath and spent the night in that room with that bath tub, and the next day he met one of his friends from up in his country, and after shaking hands with him, he said: "I tell you what, you ought to have seen the room I had last night. I had the greatest room you ever saw; I had a room with a bath, porcelain lined bath tub, hot and cold water and all the towels I needed." And he said, "Oh, but didn't I wish it had been Saturday night."

And I want to tell you, my dear friends, that when you get this home right, I want to tell you and I mean it,. I tell you that when a man will do what I'm talking about in any community, that community will be made better; and God only knows, nobody knows better than I do, that the best religion in the world is the religion over here at Oakdale. I want to tell you that when you get a community like that, you've got an influence; and God only knows, I hate to say it, I get into communities where I wouldn't have my six children grow up in that community for five of the best farms in it, not for five of the best farms, showing the power of influence and the power of environment and the power of surroundings.

When the home is all right—I can pin this down by telling you of two young men who graduated at College; one started out to preach the Gospel, the other got on a ship and went around the world as a mariner. His ship came back after sailing around the world and anchored in the harbor where his friend was preaching the Gospel, and the anchor wasn't more than cast until he said, "I'm going up to see my friend, John, and see how he's getting along preaching the Gospel, and I believe I'll take my parrot along up with me. So he started along with his parrot to see the preacher. He went in the house and set his parrot down on the center table and after shaking hands with the preacher, he said, "John, I've brought my parrot along, I want to show you what a great talker I've got in my parrot, he's the greatest talker in the world." The preacher said, "That's a queer coincidence, I've got a parrot and I think mine is the greatest talker in the world and I will go and bring him in and show you a parrot that can talk." So the preacher went out and got his parrot and set it down on the table alongside of the sailor's parrot, and the two birds sat there looking at each other for a while. And after a time the preacher's parrot said, "What must we do to be saved?" The sailor's parrot said, "Pump like Hell or go to the bottom." That shows the power of influence, the power of surroundings and the power of the home.

And I want to say, my dear friends, in Washington county, that you live in the greatest country in all the world out here. They can talk about all the countries of the world, I've been over some of the United States and I want to tell you that Pittsburg, in a radius of a hundred miles, is the greatest spot in the known world. That's right and I mean it. You've got the farm land, you've got the coal, you've got the gas, you've got the oil, you've got the greatest manufacturing interests in the known world and the greatest markets the sun ever shown upon; that's the kind of a country you have in Washington county, and around Pittsburg.

It puts me in mind of two old fellows over here in Pittsburg. One old fellow read the description of a sky scrapper they were going to put up in the city. After he read the account of this great building they were going to erect, he met one of his friends and said: "They allow to put a building up in Pittsburg so Gosh dang high that the top will reach most half way to the moon; they are going to set it on the corner where Fifth Avenue crosses Wood Street, right where the old cigar shop for years and years has stood. It is going to be so consarned tall that folks bound for the top will have to have a pilot or they won't know where to stop. You'll wish for three days' rations, a change of clothes and socks, when you start for the upper regions in that elevator box. There'll be so many stories to this building, goodness knows that a fellow couldn't count them on his fingers and his toes; and when one gits up to the garret, he will have to have a spy glass or he cannot see the town. The Allegheny Mountains then will dwindle out of sight; sky larks will get dizzy if they fly to such a height. The people must be going crazy; feet and yards are out of style; soon, they'll have to measure buildings by the furlong and the mile. If the city keeps a grabbing and spreading up so high, there soon won't be no room at all twixt the street and the sky. The sun won't have no room to pass through Pittsburg anyhow, and it will have to go around by Wheeling and Bellaire."

**The CHAIRMAN:** This closes the program for the evening.

**MR. HUTCHISON:** I am sorry Dr. Holmes couldn't be here. It places the College at a little disadvantage. As a trustee and representative of the College, I will say that some mistake or some accident or something has happened, because it is well known that our force up there are anxious to serve the people of the Commonwealth, and I know he would have been delighted to be here if he had not been detained. I have a letter from Dr. Sparks speaking of it, and I cannot tell, and the teachers and professors here cannot explain it.

I want to compliment you ladies on your entertainment; and my friend Seeds, and I know it will stimulate the Institute and help the sessions, the Ladies' sessions throughout Pennsylvania, this meeting that you held tonight. I speak for the Board and for the representatives here, the Chairman of the different counties and I want to thank you for the good meeting you have had.

After announcing the program for next day, the meeting adjourned.

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Wednesday Morning, May 21, 1913, 9.30

Mr. John T. Smith in the Chair.

**The CHAIRMAN:** The meeting will please come to order. Fellow members of the State Board, and Chairmen of Institute Workers, Lecturers and Citizens of Washington: It gives me great pleasure to be in your county this morning. Although it is my neighboring county, I have never been here before, but I feel almost as if I am at home with you. I scarcely reached your town until I met some of the old people who used to live over in old Fayette. I met several of my neighbors of years ago who have now moved to Washington county, so I feel at home. One of the first men I met was a young man I used to teach school with nineteen years ago. He was on one hilltop in the mountains and I was on the other, and I had not seen him for about eighteen years until I met him on the train. I find he is one of the foremost men in your town. I refer to the editor of this paper, Mr. John L. Stewart.

You have some nice towns over here. In our county it is mostly coal, coke and smoke, Monarch smoke. I know there are a great many farmers coming into this meeting. I think we can have a good deal of interest developed and get it going a little like the story I heard of an Irishman. There was an Irishman one time who was a courier on the railroad; his business was to clean up the engines as they came in in the evening, and one evening an engineer came in late and said, "Pat, wouldn't you like to be able to run an engine like I can?" "I would," said Pat, "I'd rather do that than eat my supper." "Well," replied the engineer, "hurry up and clean this engine and you may run her into the round house." Pat cleaned her up, got in, pulled back the lever ,turned on the steam and the engine started into the round house at a terrible speed. He was afraid he was going to run clear through and come out the other side, so he jerked the lever back, reversed it and the engine started down the railroad track at a great rate.. He reversed it again and went back into the round house and beckoned to the engineer. The engineer said, "I thought you could run an engine?" "Aint I running the thing," said Pat, "don't you see the thing going up and down the track?" "Well," said the engineer, "why don't you stop it?" "Why didn't you shut the door of the round house when I had her in there?"

Now we want to get this meeting going at such a rate that we won't know how to stop it, and have one of the best we ever had and I don't want to stop until the Secretary calls us down on Friday. The first man I will call on this morning is Mr. R. J. Weld, Assistant Secretary of Agriculture, who will talk to us on "Selection and Breeding of the Dairy Herd."

Mr. Weld spoke as follows:

## SELECTION AND BREEDING OF THE DAIRY HERD

By R. J. WELD, *Sugargrove, Pa.*

Mr. Chairman, Ladies and Gentlemen: The best information I can get regarding cows is that 4,400 pounds of milk per animal is the average production. I assume that is pretty nearly true. This morning I want to tell you a little personal story, if you will pardon a personal reference in the matter, about a herd of animals that produced, on the average, 4,400 pounds of milk in the beginning and upon that foundation was builded a herd the end of which is not yet, I hope, but which has advanced in production over a ton of milk per cow from that start, and this is the herd I have been personally interested in and I am going to tell you about it because it is a thing I know the most about relative to cows.

Just refer to the chart for a minute. At the beginning, this herd, when we first began to keep records, showed the results at the end of the first year that are indicated on this longer chart by the first set of bars. There are three sets of bars. Those bars indicate the lowest producing animal in the herd (indicating on chart), the middle bar indicates the average production of all the animals in the herd and the longer bar the highest production, or the production of the animal that produced the most. There is what we get at the end of the first year, what is indicated by those bars there. Then, period by period, as is indicated by the dates, results have been compiled and drawn off and charted out so that we might see what increase or improvement of advancement was made as the result of our work up until last year, which is over here on this shorter chart. For instance, compare the middle bar there, 1912 with the middle bar here in 1894, and you will see that there is a gain of 2,700 pounds of milk per animal. Now, no new animals were bought; we just started with that average herd and that is a point I want to bring out first, the selection of the animal.

In our work as Institute men, traveling over Pennsylvania, the inquiry comes up at almost every place where they are interested in buying, "Where can I get some good cows? For instance, where can I get some 7,000 pound cows?" They are not to be had, gentlemen, in any great number. They are not to be had in the number that will meet the demand in Pennsylvania. They have got to be produced, got to be grown on the farm, and they should be, because, along with the development of the dairy itself, must come the development of the dairyman, when we had 4,400 pound cows, we had 4,400 pound men; that's all the ability we had to produce milk, because part of the production of the cow must come through the skill and knowledge the dairyman has to make that production, and in any dairy in Pennsylvania where the man hopes to improve, the improvement must be in the man first, he is the leader, it is the man that blazes the way! so I think the wise and sane plan for the dairymen of Pennsylvania is to develop their own herds. It means some expense, some trouble and its a little personal work, I know, and it does more or less interfere with our general farm work.

This was brought home to me about three weeks ago in my own herd in a way I never had known before. I had gone into a cow testing association so as to be in with fellows that are interested in the work. All the rest of them are over in New York State, but they did come over the line and let me in, and the tester came to my place and relieved us the 24 hours he was there of all the work excepting the milking of the cows. The man and I milked the cow and turned the milk over to him and he weighed and took care of it after that, and I discovered then that the time it took up to do this work amounted to nearly as much as the time of milking the cows, so it is somewhat of an expense to me to carry on the work. Nevertheless I will try and show that I have been warranted in making this expense, just as Dr. Thorne showed us yesterday that we are warranted in making an expense when we get the desired results.

What I found in that first upper bar—see the length of the short bars compared with the length of the long ones, and those are all cows that had been bred by my father on that farm and were thoroughbred animals, and yet we found that difference that is indicated by the length of those bars and prior to the determination of that acurate knowledge, we were just guessing at it, you see. After we had the accurate knowledge, we discarded, of course, those animals that made the lower records. The getting of the daily weight is a thing that a good many of our farmers fall down on. It is like the man Dr. Thorne told us about yesterday, he wanted to harvest that ten acres of clover and let the experimental plot go and get wet and he lost the results of the experiment. You have got to be whipping yourself up to the point that the daily data we accumulate day by day is the thing that makes the final result and the securing of this data is not expensive in the paraphanalia required to secure it. It takes a little time, but it is educational in its effect, it makes observing men of us, careful men, it makes men that are accurate in their work. Why, the keeping of the data pays me year by year just in the influence it has on the man that helps me; he likes to have everything that goes down in black and white for the inspection of his employer look well, be a credit to his work, consequently it keeps him up to his standard, and that is what we did, we got that information, we made the selection upon the basis of the information or upon the basis of the performance, upon the proficiency, if you please; that was the basis upon which we made the selection of the animals in the herd and are making it today, because we are just keeping on day by day and there is still a difference after eighteen years, in the ability of the individual animals in that herd to produce the pounds of milk. So it is not safe for me, as a dairyman, to rest on any work I have accomplished so far and be sure that the business will still continue to be profitable to me.

I made the selection then upon that basis, with the daily use of the milk scales and the monthly use of the Babcock test and a certain day in the month comes and it is the day to start to take the samples and if the threshers are there silo men are there, it don't matter what urgent piece of business is on hand, if that is the time to commence, we aim to commence so we will favor each animal with uniformity of our part of the work, we will give each animal a chance to show just what she is capable of doing and not doing under the average daily conditions that exist and affect all the animals.

After we have made this selection, there is another point, the securing of some animals to take the place of those we are going to discard. We are going to discard some because a 4,000 pound animal is not a profitable animal and if the average is only 4,400 pounds, there are a number below 4,000 and if a cow won't give over 4,000 pounds of milk in Pennsylvania, she is running her people in debt and we don't want to be that kind of men, we don't want to be prosecuting a business that is running us behind and we should not. So, to take the place then of the animals we must necessarily discard year by year for one reason or another, primarily because they are not capable of coming up to our standard and we have got to have some to take their place. Now here comes another point—we couldn't buy them, didn't want to buy them. The only animal that I know absolutely was a diseased animal on our farm, an animal that was bought and brought there as a calf, and afterwards developed disease. Whether the predisposition came with the animal or whether the whole thing developed on the farm or not, it is true, she is the only animal that ever di seased on my farm that I know of. That is one reason why I want to raise them. Another is, that I want them under my personal supervision from the time they come into this life until I am through with them. I can weave into them or attempt, at least, to weave into them, the characteristics that I hope for and desire and think will develop a proficient animal.

Now I have come to believe that in breeding, we first should have a standard, then we should go after what we want. I am supported somewhat in that. We are going back to the first book in the Bible, the book of Genesis, and I find that a certain man wanted ringed-streaked and speckled cows, a certain Jew; that's the kind he wanted, that's the kind that meant profit to him, that's the kind of cow his father-in-law would give him as his wage, and he went after ringed, streaked and speckled cows, and the Divine Word says he got them. I believe that holds true right down to this date and we want to go after the thing we want. That means this, that we've got to have an ideal, we-ve go to know what we want to get, tempered with the best knowledge and with our experience ,tempered with the environment we have at home as compared with the environment under which the dairy breeds have developed, and tempered also, if you please, lastly, by the general character of the animals in our particular neighborhood. For instance, if in my particular neighborhood there are eight or ten men breeding the same breed of animals, there is an advantage for me to go in with them in that same line of breeding. We can co-operate in more ways than one; we can compare notes, we can co-operate in building and developing, we can co-operate in buying and selling, a decided advantage, as you know. So that is the thing to do.

Now in dairy work, the thing that I was after on my part was butter fat, and I contend this, that first, if you want to get pounds of butter fat, you must have pounds of milk or pounds of material to carry that butter fat, so there are two factors in it that I was after—I wanted a lot of milk and I wanted rich milk, and I looked to one of the breeds that gave a large flow, comparatively large flow, and that also was rich in butter fat, because that was to be my cash product, my cash return from this dairy was to come through the medium of butter that I sold. For that reason I want a breeder then with this charcteristic, and after getting an animal—and by the way, that's where I spent the money, not very heavy, not enough to swamp anyone; I spent, to be specific. Since 1894, I spent $220 only in buying thoroughbred animals for my herd and $100 of that was spent last year in the last animal I got so I haven't spent anything exorbitant, and I have not spent a sum beyond the reach of any breeder of dairy cattle in Pennsylvania, in order to accomplish this result I have shown you thorough breeding and to be particular about it, I have sold these animals so far, when I have gotten through with them for enough to reimburse me. The account stands me in debt now, but I have two animals on hand, one of which I expect to sell this year. Whether I will come out even or not I don't know; that is a side line that should not stand in the way of the breeding.

The Director of Institutes in New York State said last February that a man could pay $400 or $500 for an animal that will put into his offspring the development and improvement that he is capable of putting in, and still make money at it. Well, I chose this animal, used him for a reasonable period of time, then chose another of the same breeding a little better, better backed up, reinforced with better production back of him, and have kept right on in that line from time to time, getting a new animal about every three or four years to take the place of the old one, not practicing inbreeding, keeping shy of that, and keeping up the matter of selecting the animals upon the basis of their performance, and in that way have gotten the results as indicated upon the chart before you.

**A Member:** Is your herd Jersey or Guernsey?

**MR. WELD:** Guernseys. The heads of the herd have always been registered Guernseys.

A Member: Do you inbreed?

MR. WELD: I did in the first instance, sir, because I made a radical cross, but since then I have not inbred, but in the first particular, when I made the first cross, I had half bloods, then I inbred them because, as I have already stated, I was making quite a radical cross from the mother in the herd, and got good results so far as I could see.

A Member: Does that warrant the influence of a good sire on dairy herds?

MR. WELD: I believe so; I believe that is the best thing for the Pennsylvania dairymen to do.

The CHAIRMAN: Will the gentlemen in the audience please write their theories down or else give them after Mr. Weld gets through with his speech.

DIRECTOR MARTIN: Just a word. If Mr. Weld would consent to allow direct questions, we will be glad to have you ask the question just as it comes to your mind. I think the stenographer can get them, and it will probably aid Mr. Weld in arriving at a conclusion as to just what you want him to develop in his talk.

MR. WELD: Now it seems to me that the dairyman who follows along this line only puts into operation just the same principle that the poultryman does, that the corn man, that the potato man does or that any other man does who is trying to improve the thing that he is working with, be that animal or vegetable. I cannot see it any other way than that there is simply one principle involved and that is the selection of the fittest, the selection of the animal or animals whose performance indicates that it has capabilities and possibilities above the average, and when we do that and follow that up with improved conditions and environment that are demanded by the machine that is going to make a greater performance for us, we are surely going to get some results for our work.

And it strikes me this way, that it is good for a young farmer, a young dairyman, to branch out along that line. It is an educational advantage that he has, it is an opportunity to pursue his education, if you please, right along day by day, after he has gone on to the farm and gotten into the harness for himself. He has left school, he has left the Agricultural College, perhaps taken with him what is in the books and what he has got in the class room, he puts that into operation ,he runs against obstacles, he tries to solve them and does solve them. He solves them out of the knowledge he gets at home, reinforced and backed up by the knowledge he mines out day by day in his work, so it is a decided advantage on that score in the matter of selecting the animal or plant we are dealing with. I have come to believe that the man who is careful in his obligation and makes a study of the selection and preparing and the crossing of animals, will make a better parent, he will make a better father, when he understands some of the laws of Nature that enter into all plant and animal life, and to his profit and to the advantage and profit of the neighborhood in which he is situated.

Now as to whether or not it pays—it has taken in some work upon my part to get this done. Not until this present year was I able to get into this Association, which I think is a grand, good thing, and I went into it just to get stimulated a little so it would come nearer home and we could get it started at home and more might get the advantage of it. Where that is possible, it relieves the individual man, somewhat, of some of the tedious part of this work. Nevertheless it also takes from it some of the personal interest he would otherwise put into it day by day. In the time I have covered in the selecting and breeding of these animals up to the close of 1912, I was able to make the animals that came from that foundation herd of 4,400 pounds produce me 7,144 pounds, or, a gain of 2,744 pounds of milk per animal per year. Now that amounted to something in dollars and cents if I had sold the milk, but I did not, I converted that milk into butter and sold the butter and made a gain in butter fat.

The lower set of bars here indicates the butter fat; the first year I only had an average yield of butter fat of 186 pounds. There was one animal that went higher, and a number went lower than that. Last year you see the result was 338 pounds of butter fat, a larger percentage of gain in butter fat than in pounds of milk. I attribute that to the fact, already developed, that I was breeding along the line of animals noted for the production of butter fat, and that the pounds of butter fat that has been increased, per animal, was 151, or in other words, I had increased the production of butter fat per animal in an amount equal to the average production of butter fat of the average cow of Pennsylvania or New York or Wisconsin. If I sold that butter fat for 30 cents a pound, I have increased it $45 worth, and it seems to me that has absolutely paid me for the time and trouble I have taken in developing this herd.

MR. GOODERHAM: You say that you have been building up your herd for 18 years?

MR. WELD: Yes, sir.

MR. GOODERHAM: Has each of the crosses been an improvement over the cross before it?

MR. WELD: Well, yes, Mr. Gooderham, each of the crosses has been an improvement, although there was one cross in which I practically stood still, but it was for another reason, I think. I believed that I was the factor that was at fault, not the animal that I had at the head of the herd, and the factor was this: That I did not appreciate the fact that increased production called for a greater amount of fuel, and I was not giving the animals enough. Of course that question comes right along with the question of development; we are not to take that up this morning, but that must come. This one period in which I seemed to stand still and did stand still for two or three years until I got the situation analyzed, was the fact that I was not supporting those animals sufficiently to enable them to make the increased production. Now several factors entered into that. The natural pasture I had been depending on year by year got poorer and poorer; there was a falling off that said I had increased the stock, a larger number of stock were on the same area, but cut down the amount of food they had; so I was entirely at fault, and, as I said before, the breed or the breeding was not at fault. Now, if there are any other questions, I will be glad to answer them.

MR. HULL: What is the object of the cow testing association and what is the benefit of it?

MR. WELD: The object, Mr. Hull, is simply to have a man come to your place and test and weigh and sample and advise you instead of you doing it yourself, and you pay him for it and he does that along with twenty-six neighbors of yours, and does it monthly and you pay him one dollar a cow, or in our Association, the minimum fee is $20. I have to pay $20 for this man and he will come to my place 12 times in the next year and be there for 24 hours only and compile some data, presumably, from which I can draw some conclusions as to the animals I ought to keep or discard. In my case I am doing the work myself, but other fellows in the Association are not doing it and they are going at it blindly just as I was before I went into the work, and he will be a help to me because he will put before them some definite data or information upon which they may base their judgment and base their selection, and he will advise them—he does advise them. He told me of a number of instances where he advised them in regard to the ration they were feeding, and they were not feeding a ration that was in accordance with our best teachers as to the kind and quality and amount that the animal should have to be able to produce what she is able to produce; that is his work.

MR. HULL: That man is an expert?

MR. WELD: Yes, he is an expert along that line, but he is not as expert as I wish he was. He is a young man, this man that we have, he is under majority, he is 19 years old, he lacks personal experience, but he is the best man we can get hold of and rather than have no man at all, we'd better take this man. He will develop, at our expense, but we are warranted in making the expense, but because if we didn't have him, there would be nothing done along that line and the 26 of us in the Association would simply go along in the same ruts we have been going along for the last 25 years and no improvement would be made. In every instance I know of where an Association has been started and interest aroused and enthusiasm awakened, good has resulted. It is a sort of a missionary work that precedes more substantial improvement in the dairy situation.

MR. BILLINGS: Do you still weigh your cow's milk, individually, every day?

MR. WELD: Yes, sir.

MR. BILLINGS: The whole Association does that?

MR. WELD: No, only part of the Association are doing that.

MR. BILLINGS: They allow him to weigh for the one day and figure from that?

**MR. WELD:** He does this, Mr. Billings, in my own case and in the case of every man that is weighing, he takes the actual weight for the month and the man who is not weighing takes his own weight for the 24 hours.

**MR. RODGERS:** Tell me what effect the inbreeding has when you come to enter the stock, have it registered in the Breeders' Association; do they object?

**MR. WELD:** In the Guernsey Association they do not. Whether they do or not in the other associations, I cannot tell you.

**MR. ROUSE:** They do not object in the Holstein Association either.

**DIRECTOR MARTIN:** Mr. Weld, from your experience in traveling over the State and testing butter fat content in the milk of various cows in different portions of the Commonwealth, have you been or have you not been impressed with the thought of the importance of dairymen learning exactly what is the product of each of their cows, each cow of the herd? I would like to have your experience along that line.

**MR. WELD:** Yes, Mr. Secretary, we have been impressed with that thought, that the average dairyman knows comparatively little and he makes serious mistakes. That was brought right home to us last winter in one Institute we held when two animals were brought down, the milk of two animals was brought down to be tested and the test was just the reverse of what the man expected. Now, if he had based his selection, you see, upon his expectations or what he thought was his knowledge of the animals, he would have drawn a wrong conclusion because our results showed just the reverse. The animal he thought would test best, tested the lowest and the animal he thought would test the lowest, tested the highest. Now if there are no other questions, I will thank you for your attention and close.

The **CHAIRMAN:** Has anyone any remarks to offer on this subject?

**MR. STEWART:** I want to know of Mr. Weld if he tests a cow at the beginning of this month, for instance, and finds that she shows a certain per cent. of butter fat, can he, by feeding and care of that cow, make her show a higher per cent. in one month or at any other period thereafter? I am not a dairyman.

**MR. WELD:** Well, Mr. Chairman, that's a question we get almost everywhere we go.

**MR. STEWART:** I never heard it before.

**MR. WELD:** Mr. Stewart, the best information we have is this; that the animal is born to give a certain percentage or richness in milk, granting that she has the normal conditions, that will enable her to do it and that she is normal health and that every thing is normal when the sample is taken and the sample is taken correctly and correctly represents what she produces. Beyond that we are not able to stimulate or increase the percentage of butter fat. Now that is contradicted time and time again by a whole lot of conditions. The sample may be taken when the animal is out of health the sample may be taken when the animal is underfed or excited or when the animal is not in normal condition, or the normal conditions under which the sample was taken were disturbed and then the sample will vary from the normal, and you take one thirty days later and if that is under normal or abnormal conditions, you may get a decided difference in the sample.

I overcome that in this way: I take a sample of milk from the cows for 8 consecutive milkings, 4 days, just to overcome the daily variation, because there is a daily variation under normal conditions. This spring we sampled animals in my herd every day for a number of days and we had as high a change as two per cent from the highest to the lowest, run it right along for 14 milkings, so you see the animal has a most wonderful control over the quantity and quality and you have got to catch her, if you say an animal tests so and so, you have got to catch her when the conditions are such that she is just giving what she normally would, and so often the conditions are different—if it is a hot day or the flies bother her or somebody comes into your stable unexpectedly—anything that will affect the flow will affect the quantity; so, to get as good conditions as you can, we want to keep everything in smooth running order. For instance, to illustrate: The other night when this gentleman came, he is a strange man and had never been on my farm before, his name is Martin, I said, "Mr. Martin, you may ask us any questions that are necessary while we are milking, but we are not going to attempt to visit with you at all." Mr. Martin staid in his place, asked a few questions, he asked them quietly and we prosecuted the milking that night as quietly as we could, had everything as normal as it could be, because I wanted that day's result to represent what the cows would do if the stranger had not been in the barn, and I took extra precaution the first time he was there, because he was a stranger and the animals are sensitive to a stranger, and I asked him as a contributing factor to the result he would get from me, to abstain from visiting or unnecessary conversation or anything that would distract the cows attention from the fact that we were milking her.

MR. STEWART: Haven't you found that the next day she would overrun her percentage?

MR. WELD: Yes, sir, if she goes high, she will drop back the next.

MR. STEWART: And if she loses one day, the next day she will overrun her natural percentage.

MR. WELD: Yes, sir.

MR. BILLINGS: That isn't always true.

MR. WELD: No, sir, but that is the general supposition; if you have a high test one day, you are liable to have a low number of pounds of milk, and then the next milking you will have an increased flow and the percentage of butter fat is liable to be lower than it was.

**MR. BILLINGS:** Then do we understand that if you get a low test to-day, the quantity is low also?

**MR. WELD:** No, with a low test you get high quantity.

**MR. BILLINGS:** Just another question right here: Changing your cows from dry feed into pasture, how does the test run?

**MR. WELD:** The test will drop invariably, because you not only change feed, but a whole lot of conditions. You change the animal from comparatively quiet conditions to an opportunity to run and race and tear around, and you change their feed, you change them from a condition under which they have feed and lay down and rest and stimulate production of milk, to a condition in which they can spend the whole day on their feet and come in at night tired and lie down and all those things lessen the butter.

**MR. BILLINGS:** Last month if you were testing the cows in the barn and this month in the pasture, your test will run lower?

**MR. WELD:** Yes, sir, my test will run lower but the flow will be higher; the flow is creeping up day by day, and when I make these tests next week, I'm pretty sure the test will be low. The May test is low; the June test will be a little better, but pretty much the same as the May test and then it will gradually start up towards the end of the year.

**MR. BLACK:** Do you feed any dry feed?

**MR. WELD:** Yes, sir, feed grain the year around.

**MR. BLACK:** Does it make any more butter?

**MR. WELD:** Yes, sir, because I increase the flow of milk, I get more pounds of butter, because I have increased the carrier. For instance, if the cows in the barn are giving 20 pounds of 5 per cent. milk, that's 20 pounds of butter milk; if they go to the pasture and give me 30 pounds of milk, that will mean more butter.

**MR. BLACK:** Isn't that different from what the experimental stations put out? A few years ago at the University of Wisconsin they were put in pasture, all kinds of pasture and there was no difference in the quality of the milk.

**MR. WELD:** That may be true, but the average dairyman of Pennsylvania is pretty apt to underfeed, and so the general condition in Pennsylvania is not what you find at the experiment station, where they know these things and take cognizance of them and take advantage of the knowledge and keep the animal up to her normal production.

**MR. BLACK:** But we want to reach something definite; can we change the quality of our milk?

**MR. WELD:** Through breeding we can increase it as shown by that chart—we can increase the pounds of butter fat. I increased the pounds of butter fat I got from that herd more than I did the pounds of milk that the animals produced, and that was through breeding, through the infusion of this Guernsey blood, for instance.

MR. BLACK: I had a book from the University of Wisconsin which says plainly that we cannot change the quality of milk.

MR. WAMBOLD: We are shipping milk from pure bred Holsteins to Philadelphia for the wholesale market. During March and April we had to add grain to our milk to keep it up to the required percentage of butter fat, because it is tested by the city. During May and June we had no difficulty. Also, we have found that the amount of fat on an animal will make a difference when she is officially tested, and an animal will vary 2 per cent. from one year to the next by the quantity of fat on her body.

MR. WELD: If the animal is fat, you say?

MR. WAMBOLD: Yes, abnormally fat. I know men who are testing pure bred Holsteins who will give their animals a long rest, get them abnormally fat and during the test, decrease the amount of feed for a short time so they will take the fat on their bodies to put in the milk, and they will get an abnormal percentage of butter fat.

MR. WELD: I have not worked that out at all, but I have done this which, in a way, substantiates what you say; in the past I have increased the weight of the animal, in other words, I have striven to keep them up in better condition, and that may account for part of the increase in the butter fat I have gotten out of the herd. I carry more weight on those animals now than in the beginning. I don't allow them to get thin if I can prevent it.

MR. HULL: Then we understand that your increase of butter fat has been through breeding rather than feeding?

MR. WELD: I think so, Mr. Hull.

MR. HULL: Well, I think that is generally conceded.

MR. WELD: That is what I attribute the increase to.

MR. STEWART: I just want to explain why I asked that question. It may not be interesting to all of you, but it is to me. I never went out to buy a cow in my life, but what I always found good ones; and when I have a cow to sell I must admit that she is always a good one. But I have been deceived and I expect I have deceived other people. We are testing milk now in our farmers' organization, and the reason I asked the question was this, that when I go out to buy a cow and the man who has the cow for sale says she is a good one, I say to him, "I want a sample of the milk to-morrow morning, I want to see you milk it from the cow and I want to test it." That will give me an idea of the value of that cow. Now, according to Mr. Weld's answer to my question, that will give me a pretty fair estimate of the value of that cow. It will tell me whether she gives 1 per cent. or 2 per cent. or 3 per cent. and so on, and I believe it is a pretty good basis upon which sales of cows should be made. They ought to be tested. If I have a cow that will show 4 per cent. of butter fat, would that be a good showing?

MR. WELD: It would.

MR. STEWART: And I know it, and she has been tested fair, I'll want a great big price for her and she's worth a big price and I don't deceive the man who buys her when I sell her upon that basis.

MR. CLARK: Do I understand Mr. Weld to say that in your breeding you can increase the amount of butter fat by calves that follow; not in the same cow?

Mr. WELD: Yes, that is my supposition, Mr. Clark.

MR. CLARK: That is what I want to know.

MR. WELD: Yes, sir. For instance, to be specific, first that 4,400 pound herd tested very low; some of the animals only tested two-nine, and upon that foundation I builded a herd through breeding and through selection, through eliminating those low fellows, so that now the average test is four-seven or four-eight.

DIRECTOR MARTIN: You would eliminate the feed; you said once in your talk that your herd stood still.

MR. WELD: Yes, sir.

DIRECTOR MARTIN: For a year or three years?

MR. WELD: One year.

DIRECTOR MARTIN: But you supplement that by saying that you were under-feeding that herd. Well, now, when you say through breeding, do we understand you to mean after the cow is fed up to her normal condition?

MR. WELD: Sure, that must be a foregone conclusion, and one of the first things I found when I went to investigating this work, the United States Government said, first be sure your animal is well fed, and that is a question every dairy man wants to ask himself, if he is giving the machine that he is working with, the kind and quantity and amount of material that she demands to make her maximum production.

MR. CLARK: After a cow is up in her normal condition, you then cannot change the amount of butter fat?

MR. WELD: That seems to be the best information that is given, but, through breeding, Mr. Clark, you can.

MR. DRAKE: In that period when you stood still, was it in quality or quantity?

MR. WELD: It was mostly in quantity.

MR. DRAKE: The quality remained practically the same?

MR. WELD: The quality remained practically the same, but I did not get so large a flow.

MR. DRAKE: When you bred those cows from 4,000 pounds up to 7,000 pounds, did they give you that quantity on the same feed?

MR. WELD: No, sir, they have got to have more food than the 4,000-pound cows; there is a greater machine at work; you have increased the capacity of the boiler, of the machine, it's got to have more fuel. It is not necessarily an increased expense, the net return will be greater. For instance, here is the result of last year; follow out that first line, which represents the production of the animal at the head of the herd last year; she made butter fat at a food cost of 20 cents a pound. She was the largest producer in the herd. Run down the line and you see the price increases, both per pound of butter fat and per 100 pounds of milk. The larger the production, the more economical the production and the lower the price of production per pound or per 100 pounds.

MR. BARNES: There is a question I would like brought out further. This gentleman shipping milk to Philadelphia, says his milk tests better after they go on grass. My experience is the same, and your cows test the other way. Can you give us any cause for that?

MR. WELD: Well, I could not analyze that, I don't know.

MR. WAMBOLD: We feed our cows through the winter, and also as the season advances, throughout the winter we increase the amount of protein in our ration, for the simple reason that we feel that the longer an animal is fed, it will increase in economical production; there will be a greater loss of protein in the excretions; also that animal will have a new coat in March and April and will use part of the richness of that feed to build up here system. Then we increase the amount of cottonseed meal and protein at that time and still we cannot keep up the amount of butter fat. This milk is tested by the city authorities, and when it goes below the standard required, we skim milk and put cream with it ,but when they go on grass, we have no trouble. I might say that this year the animals were in much better flesh than ever before and we did not have near as much trouble with the percentage of butter fat in the milk as in the past with the same cattle. We try to make the animals freshen in the fall and winter, but I suppose the majority of them do not freshen till nearly January.

MR. BLACK: At the University of Wisconsin, the cows don't test higher when they go on grass.

A Member: My experience has been that whenever we turn to pasture, the percentage of butter fat lowered in the milk. We try to have our cattle freshen the entire season through, some each month, but whenever we turn from stable feeding to pasture, the percentage of butter fat is lower, and I always receive the highest percentage of butter fat when my cattle are what we call stable fed, entirely. We feed ensilage but no other chopped grain.

MR. HULL: Sometimes changes in conditions will make differences that we do not take account of; there is nothing mysterious about it. Sometimes there's an introduction of Channel Island cows in the herd that will change conditions. Sometimes there will be a cow come in that gives a richer percentage of butter fat, or a less, and these things often make changes in conditions that we cannot account for.

MR. BILLINGS: In our home herd we are testing our cows individually, just as Mr. Weld has done, and have been doing it for years, and the greater portion of those cows, when we turn them into grass, the percentage of fat will increase as well as the flow of milk. We tested our cows last Monday and they had not been into grass but a week, and in some cases the percentage of butter fat increased one per cent.

A Member: This butter fat does not affect the amount per cow per day, does it? It is only the percentage in milk, only the butter fat is reduced in the percentage of milk?

MR. BILLINGS: We are figuring the butter fat on the percentage of butter fat; we get more butter fat if the cow is fed just the same, but our herd on an average was increased—the percentage of butter fat and the quantity of milk.

A Member: There is more water in your milk; you don't lose anything?

MR. BILLINGS: No, we always gain in quantity.

MR. CARD: I merely wanted to emphasize one point that Mr. Weld brought out in the earlier part of his talk. He said he increased that yield from 186 pounds, if I remember, to 338, in some 18 years, and his expense for improving the stock was $220, if I remember. I think that is a point well worth emphasizing in Institute work, and I want to cite my own experience along a similar line. Some 15 or 16 years ago, when I took charge of my farm, I got on it 6 common cows from the community. The first year we used a pure bred sire of another breed that was available. Since then I have used constantly one breed. Now there are ten pure bred animals giving milk, and about as many younger animals, pure bred. The herd is uniform in appearance. I challenge anyone to pick out the grades from the pure breds, and that has been accomplished at about the same cost for pure bred stock which Mr. Weld has put in his herd during that time, and the sale of animals has replaced that, as in his case. It seems to me it is an important point.

The CHAIRMAN: We will hear from Dr. Louis A. Klein, Dean of the School of Veterinary Medicine, University of Pennsylvania, on the "Principles of Sanitary Milk Production."

Dr. Klein spoke as follows:

## PRINCIPLES OF SANITARY MILK PRODUCTION

By DR. L. A. KLEIN, *Philadelphia.*

Mr. Chairman, Ladies and Gentlemen: I just arrived here and did not expect to be called on quite so soon and am a little out of breath from climbing the stairs at the Court House—I understood that this meeting was being held at that place and went there first, and we went into about every room before I discovered that I was in the wrong place.

The subject that I am to discuss, is the "Principles of Sanitary Milk Production." I will endeavor to mention the conditions which are concerned in the production of what is known as sanitary milk. We have, in milk, one of our most valuable foods. It contains all of the nutritive substances necessary for the nourishment of the animal body, the human body—including growth; and then, too, these substances are present in a form which makes them readily digestible, a condition which makes milk a very valuable food for invalids and for infants and for other individuals with a weak digestion.

Now, for these very same reasons, milk is also a good substance for the growth of bacteria, on account of the various food elements which it contains. It meets the food requirements of a large number of species of bacteria; and then the accessibility in which these substances are present, makes the conditions very favorable for the multiplication of bacteria. So the same conditions which make milk valuable as a food, also make it a good substance in which bacteria may grow. Now, when bacteria live in milk, growing and multiplying, they live upon these nutritive substances which the milk contains, and in doing this they use them up, break them up into other compounds and produce new compounds, new substances. Some of these substances which are produced in this way bring about perceptible changes in the milk, changes which are visible to the eye. They produce, for instance, souring, curdling, and give the milk off flavors, bad taste, bad odors. Others of these substances have an injurious effect upon the digestive tract of man, especially when the milk is used by infants or persons with weak digestion, and these substances which have this effect upon the digestive organs of man may be present in the milk without the milk showing any visible change. The bacteria which may be found in milk are very well known, where they come from and how they get into the milk, and the conditions which are favorable to their growth and multiplication are equally well known. We know quite as much about the different species of bacteria as is known about the different species of domestic animals—quite as much.

Now the bacteria which may be found in milk can be divided into two great classes: One class including those species which produce disease, which are commonly associated with disease, and the other class including those species which are present without the existence of disease—they have nothing to do directly with the production of disease. Now, if the milk is drawn from healthy cows and does not come in contact with diseased persons, we will have none of the disease producing organisms present. The organisms which do not produce disease directly, however, are always present in milk to a greater or less extent. This is so because these bacteria are material to the surroundings of the cow, they belong to the things that surround the cow. We find them, for instance, in the manure of the cow. We find them in the dust that is on the fodder and on the bedding, in the dust of the pasture and the dust of the barnyard. We find them in the milk vessels. We find them on the skin of the cow. They are in the teats of the udder of the cow. We find them on the hands of milker, on the clothing of the milker. They exist in all of the surroundings of the cow, so they are present always to a greater or less degree in milk. Now, these bacteria, while they are harmless in themselves, while they do not in themselves, produce disease, while they do not in themselves produce any injurious effect, some of them bring about changes in the milk which are objectionable, either because of the odor or the taste, and some of these changes are injurious. The most objectionable change is produced by the bacteria which come from the manure, and these bacteria are also found, as we would naturally expect, upon the skin of the cow. Next in order, the most objectionable change is produced by the bacteria which exist in the dust, on the hay and the fodder, and the dust of the ground, the pasture or the barnyard. We have also in this group some of the bacteria which are commonly found in the teats of the udder. The bacteria which live in the milk vessels, in the particles of milk which sometimes remain in the milk vessels, bring about a change which is not very objectionable, in fact sometimes it is a change that we want to take place; it is the change that occurs when we have what is known as the ripening of cream, that is, a simple souring of the milk. This change of course renders the milk unsuitable for certain purposes, but it is not at all harmful and in some instances this change is brought about in milk by adding these very bacteria purposely for the purpose of ripening cream to make butter, for the purpose of making what is known as acid milk for which there is at present quite a demand in some of the larger cities. Now, if milk is to keep well, if it is to retain its natural taste and flavor and these changes are to be held back or retarded, we must make an opportunity to keep these bacteria or the dirt in which they are contained, out of the milk.

Now it is important of course that the milk be cooled as soon as possible after drawing and that it be kept cool during transportation to town and during delivery in town, and also that it be taken care of properly by the consumer. These things are all necessary, but the most important of all is to prevent the milk from being contaminated at the point of production. This is the most important because if it is not attended to, subsequent care cannot have much effect in improving the keeping quality of the milk. Now, how this can be done is very well known. It is a matter that has been the subject of investigation for a number of years.

A number of methods have been tried and tested and the best of these have been selected and these better methods have been in use for a long time under every day practical conditions, so that when we take up the question of keeping dirt or bacteria out of milk at the point of production, we have an abundant amount of practical experience to guide us; we are not treading upon any untried ground. We cannot expect to keep bacteria out of milk with a strainer. The strainer will keep out the large particles of dirt, but the dirt that is soluble and the bacteria on the dirt which is held out by the strainer will be washed out and washed through into the milk. Neither is it possible to keep all bacteria out of milk under conditions which must prevail in even a good dairy barn; and it is not necessary to keep all of the bacteria out of milk, but it is desirable, it is desirable from the standpoint of the producer and the dealer and the consumer to keep down the number of bacteria or keep down the quantity of dirt to the lowest possible amount consistent with practical conditions.

Now this can be done by milking under clean conditions, by protecting the milk from contamination by dust or odors, by cooling the milk promptly and keeping it cool and by using clean milk vessels. These are the essentials. Keeping the stable clean will assist in keeping the air free from dust and free from odor, and it will also help to keep the cows clean. Now this is done usually by removing the manure from the stable twice a day, if possible, before milking; once a day, anyhow, and by keeping the window sill and the stall fittings and the ceiling and the walls brushed free from dust. If the cows are cleaned, that is to say, if the dirt which is upon the skin of the cow, especially upon the hind quarters ,the flanks, the udder and the tail, if the dirt there is loosened up with a curry comb and then brushed off as clean as possible with a brush when the cow is milked, there will be very few particles of manure, very little scurf, very few loose hairs to fall off and possibly fall into the milk pail. If the udder is wiped with a damp cloth, the few loose particles that remain after the brushing will be wiped off, or, if not wiped, they will be stuck fast so that they will not be likely to drop off into the milk pail. The cleaning of the stable, however, must be done and also the cleaning of the cow must be done a sufficient time before milking to allow time for the odor and the dust to go out of the air of the stable before milking is begun. The cleaning of the stable should be done first and then the cleaning of the cow and then the wiping of the udder. The udder should not be wiped until just before milking, because you want the udder damp while the cow is being milked, not wet—if you have the udder wet, if there is any free water on the surface of the skin of the udder, it will run down to the end of the tip and be worked off with the fingers and dropped into the milk, and conditions will be much worse than if the udder had not been wiped at all. Washing the udder is not necessary unless you are aiming to produce a very high quality of milk, and when the udder is washed, it is necessary that it be dry when milking is begun, because if it is not dry, the water will run down to the end of the teat and drop off into the milk bucket, and if the udder is not wiped dry after being washed in cold weather, you will have the skin of the teats cracking and chapping and have considerable trouble from that source.

Now the motions of milking the cow, the motions that are set up into the udder and the flanks when the teats are taken hold of and the milk drawn, will have a tendency to shake loose anything that is loose upon the skin, any dirt that is there, any loosened scurf on the skin, and these things will be there unless the cow has been brushed. This action of the udder will shake it loose and it will fall downward.

The old fashioned milk pail, with the wide top, offers a very good receptacle for catching a great deal of this dirt that falls from the body of the cow. On the other hand, what is known as the covered top pail, which has all of the top covered except a space about seven inches in diameter. If such a pail is used for milking, a great deal of this dust which may fall down from the body of the cow will be kept out of the milk. There are two types of covered top pails; there is one known as the hooded pail, which has a hood over the top and the opening at the side. The opening is upright and at the side, and then there is the other type of covered top pail in which the top is rather flat, slightly rounded, but rather flat, and the opening is in this and is rather flat. Now of course the hooded pail with the upright opening will catch less dirt than the pail with the flat opening, even when the pail with the flat opening has a cheese cloth strainer in it; fewer bacteria will go through into the milk in the hooded pail than in this pail with a flat opening, even when it has a cheese cloth strainer in it. On the other hand, however, the hooded pail is much more difficult to milk into than the pail with the flat top opening, and the pail with the flat top opening and the cheese cloth strainer, even though it is not as good as the hooded pail, is a very great improvement over the common open pail. It has been found by actual test, not once but a number of times, that this covered top pail with a flat opening and cheese cloth strainer will keep out of the milk from thirty to ninety per cent. of the bacteria that will go into the milk when it is milked into an open top pail. Of all the things which can be done to reduce the amount of dirt or bacteria which go into the milk during the act of milking, there isn't anyone which will do more than the use of the covered top pail; that is a fact that is well demonstrated.

MR. HULL: Don't it increase the amount of time in milking to put the milk in a small opening?

DR. KLEIN: It will at first. Anyone who is accustomed to using an open top pail will have difficulty at first in using the covered top pail and they won't like it, but after a time I believe that the covered top pail with the flat opening seven inches in diameter will be found as convenient to the man who attends to his business and looks at what he is doing, as will the open top pail. A man cannot milk in a covered top pail and look around the barn; he has to keep his eye right on his work, and that is difficult at first, but there isn't any part of labor—of course everything connected with the production of sanitary milk means additional labor, but there isn't any part of this additional labor which seems to give greater compensation for the amount of labor involved than the adoption of this covered top pail.

MR. HULL: There is another point as you are passing on which I would like information. After the milk has been drawn, what degree of coldness is required to prevent a further increase of bacteria?

DR. KLEIN: I will take that up later. Now, in cleaning the stable and cleaning the cows, the hands become soiled with material that is rich in bacteria, very rich in bacteria; and if milking is begun with the hands in this condition, some of this material is going to get into the milk,and if the practice is followed of wetting the hands while milking, then a great deal of it is going to be washed into the milk. Now, for this reason, it is recommended that immediately before milking, the milker wash his hands clean with soap and water and then dry them—dry them thoroughly, because it is necessary to milk with dry hands to get the best results from a sanitary standpoint.

In some dairies where they aim to produce a high grade of milk which sells at a premium in the market, the milker washes his hands after milking each cow. Now, to any of you who have not had an opportunity to observe this method, you may think that this sounds like a great waste of time, but it really takes a very little time. This has two results, it helps to reduce the bacteria in the milk and it also tends to prevent the spread of some diseases, the infection of which is carried from one cow to another on the hands of the milker, so that it is an advantage in two respects.

In cleaning the cows and cleaning the stable, the clothing will become dusty and soiled, and when the man sits down to milk, some of this dust, especially that upon the sleeves and the upper part of the body is going to be shaken off and shaken into the air just above the milk bucket, and some of it may go into the milk pail and thus get into the milk. Now this may be avoided by having in the barn a jumper and overalls and a cap to put on when the man begins to milk. A special suit need not necessarily be kept for this purpose. Almost every man uses his overalls in the work around the farm and a suit consisting of a jumper and overalls can be used one week in the barn to milk and then the next week it can be taken for other work and then go to the wash and come from the wash back into the barn for use in milking the first week and go to the other work the second week. In dairies that produce the high grades of milk, what is usually known as certified milk, these suits are made of duck, white duck. They have them white so that if they are soiled the dirt will be readily apparent, but any hard smooth material that does not have a rough surface will answer the same purpose. It need not necessarily be white. These certified dairies—there is one dairy that I am familiar with where the men have a clean suit each milking. In other places they have a clean suit every two or three days. In some places they use them a week; but of course certified dairies are dairies that are producing milk which brings a higher price on the market than ordinary milk. Bacteria are nearly always present in the lower part of the teat of the udder, and when the first milk is drawn from the udder, the greater part of these are washed out so that the first few streams of milk will contain usually a far greater number of bacteria than the milk that comes afterwards; so it has been found that if these first two or three streams of milk, commonly called the fore milk, are drawn off into a separate vessel before milking is begun, that the milk will then have a much lower bacteria content than when the fore milk is put into the regular milk pail. Now, milk has another peculiarity which must be recognized and that is that it absorbs odors very readily, very readily, and it will absorb odors more readily when it is warm, as when it comes from the cow, than when it is cold, and so we find that if milk is drawn from the cow and stored in a can in the stable with the top off, if the odor of that stable has the odor of manure, then the milk will be tainted and wil have the taste or odor of manure.

This, therefore, suggested the advisability of removing the milk as soon as it was drawn from the cow to a place outside of the cow stable, into what is usually called a milk room. When milk comes from the cow it is at about body temperature, that is the body temperature of the cow will average 101 1-2 degrees Fahrenheit and the milk will be very near up to that temperature. It is a temperature that is very favorable to the growth of bacteria; they will multiply much faster at this temperature than at a lower temperature, and most of them will multiply much faster at this temperature than at a higher temperature, so this is probably the most favorable temperature for the growth of bacteria. Now, if we lower this temperature to 60 degrees F. or below—and every degree below sixty will make a big difference—if we lower the temperature, we will retard or slow up the multiplication of the bacteria and make the milk keep a great deal longer.

This is best done by having a milk cooler or, as it is sometimes called, an aerator. If milk is carried from the barn or cow stable in which it is drawn, into a milk room and poured over a cooler, that milk will be brought down to within two degrees of the cooling fluid in a very few minutes after it has been taken from the cow; that is to say, if you have spring water or well water at 50 degrees that you can run through a cooler, and within a very few minutes after taking the milk from your cow, you run it over that cooler, the milk will be brought down to 52 degrees and that will have a great effect upon the keeping qualities of the milk, because it will have a great effect in slowing down the multiplication or increase in the numbers of bacteria. Now, if you pour the milk into a milk can and put the milk can in a tank of cold water, this will also bring down the temperature, but it will bring it down much more slower, the milk will remain for a much longer time at a high temperature, which is not only very favorable to the increase of all bacteria, but is especially favorable to the increased of those bacteria which are the most objectionable, the bacteria which come from the manure and the bacteria which come from the fodder, the hay-dust, the dust of the soil and also for any disease producing bacteria that may be in the milk.

**MR. HULL:** Will 52 degrees prevent any future increase of bacteria?

**DR. KLEIN:** There will always be some increase in bacteria as long as the milk is above the freezing point, but when you get the temperature down to 60, you slow up the growth of bacteria very considerably, especially the objectionable kind; the milk-souring bacteria will grow better at 60 than the other kind, but they are the least objectionable. When you get any degree below 60, you slow up the growth more and more until, when you get down to 32, it stops; but milk that is cooled immediately after being drawn from the cow to 52 degrees, if produced under conditions which keep out the original contaminating bacteria, keep out the dirt, will keep for four or five days, if you get milk from a cow that has been clean milked in a clean barn by clean hands into a clean milk vessel and immediately run over the cooler, if you can bring that milk down to 52 or even 56 degrees and keep it at that temperature, you can keep it four or five days.

Now, flies. Flies may introduce a great many bacteria into milk. How many they will introduce and what kind will depend altogether on what the fly has been crawling over before it drops into the milk, so for this reason, the room where the milk is cooled or stored or handled in any way ought to be screened. Now some sanitarians think that the barn, the cow stable, ought also to be screened. I am not certain that that is a good thing. Of course screens on a cow stable will keep flies from flying into the window or in through the doors, but they will not keep out the flies which are on the body of the cow when the cow is brought into the stable, and that is, I think, the largest source of flies in a cow barn, the flies that are brought in on the cows body. Screening the barn will not keep those out more than it will keep them in; so, for that reason, I am not certain that screening the barn is necessary or ever advisable; but I am quite convinced that it is advisable to screen the room where the milk is to be cooled or handled in any way, and whatever else may be done to keep down the flies or keep out the flies or keep out the flies ought to be done. A clean barn will be much less attractive to flies than one that is not clean, so that some of the other things that I have recommended for the production of sanitary milk, will also help in this respect.

If the milk vessels are used, they ought to be immediately cleaned and thoroughly cleaned. It may some times happen that these vessels may be rinsed and washed in water with soap powder and it may be thought that they are quite clean, and to the eye they may be clean, but they may contain small particles of milk which are inhabited by bacteria, and if these are allowed to remain in the milk pail until the next time it is used, they are going to be increased very greatly in number and the first milk that is put into that pail is going to take them up and carry them along. It is well known that sunning milk vessels helps to keep them sweet, helps to keep the sour odors of milk out of them. Well, this is merely because the sunlight destroys some of the bacteria. Now, if milk vessels, after being cleaned, are scalded with boiling water, any bacteria which may remain after the vessels have been apparently cleaned, will be killed—not all of them, but most of them will be killed. Better results would be obtained if the milk vessels were placed in a sterilizer or steam chest, but these things cannot be had on every farm, they are only practical on the large places, but where they are not available, scalding with boiling water is the next best thing and ought to be done. The milk vessel after being cleaned, ought never to be wiped out with a cloth; it ought to be stood upside down where it can drain off, and if this can be a sunny place, so much the better, but it ought to be a place free from dust because dust is objectionable, not because it is dust, but because it contains bacteria which, when they grow, bring about decomposition. When hay and other dried products or when bedding is put down into a barn, the air of the barn becomes filled with the dust from these substances. If milking is done at that time, some of this dust is going to settle into the milk pail, so it has been found best to put down the dry product and the bedding after the milking has been finished; and this also applies to meal and grain, although there is less dust distributed by the meal and the grain than by the dry fodder and bedding. If ensilage or beets or turnips or cabbage or any of those feeds which have an odor are fed just before or during milking, the odor of those substances is going to get into the atmosphere of the stable, and when you milk, the milk is going to absorb that odor and it will have the taste of the substance which was fed. When ensilage was first introduced, this was not understood, and when it was fed just before milking or during milking, the milk acquired the odor of it and the taste of the ensilage, and this fact brought ensilage for a time into disrepute as food for cattle; in fact it has only been within the last year that one of the largest dealers in New York City would accept milk from a herd that was fed on ensilage; but if the ensilage is fed after the milking, there will be no flavor given by it to the milk and this will also apply to those other substances which have a characteristic odor.

Now, as I have mentioned, these various things which are recommended as being benefical in the production of certified milk, take time. It is estimated that it will take on the average five minutes per cow to clean the cow; three minutes per cow to clean the stable; two minutes per cow to wipe the udder; two minutes per cow to carry the milk to the milk room and come back again for the next; one minute per cow for scalding the milk vessels; that makes a total of 15 minutes per cow per day. Now, in return for this additional time there will be some increase in milk production. We have the authority of some very good dairy man that if a cow is kept clean and comfortable, she will give more milk for the same feed than when she is not kept clean and comfortable. That is not the opinion of one man, but it represents the results that have been obtained by a number of men in every day experience, not under experimental conditions, so that the dairyman has this result to look forward to. Then there is also the effect upon the flavor and keeping quality of the milk, and if the milk is used for making butter or cheese, the flavor is a very important point. I thank you all for your attention.

A Member: Nearly everybody takes fluid at their meals. I have in mind a patient whom the doctor said shouldn't drink coffee. Later on, another doctor was called in and recommended tea. The next doctor was called in and said he shouldn't drink tea at all but should drink milk. A fourth doctor was called in and said he shouldn't drink milk because it would bring on billiousness. Is that a settled fact, that milk will produce biliousness, if used at every meal, during meal time?

DR. KLEIN: Well, I can answer that question from my own experience, I can say this, that when ever I drink whole milk, it makes me billious, but if I drink the milk skimmed, I can drink all I want, either with meals or between meals, and it does very well. On the other hand, I have a friend who tells me that if he drinks skimmed milk, it makes him bilious, but if he drinks whole milk, he gets along all right.

A Member: What is the comparative influence of hand milking and machine milking on bacteria?

DR. KLEIN: That will depend altogether upon the conditions under which the machine is used.

A Member: I mean with care in the preparation of the machine, steaming, scalding and extreme care taken in both cases.

DR. KLEIN: You cannot make any broad comparison; the worst milk that I have met with in the last two years was produced by machine milking, but that was not the fault of the milking machine, it was the fault of the conditions under which the machine was used.

A Member: Can rubber hose be kept sterilized?

DR. KLEIN.: Yes, but it would be difficult to do so without using preservatives, and if you used preservatives, rubber hose is not very suitable to run milk through which is to be used for food purposes, but I think the matter of the milking is rather a broad question and is not a question that can be answered yes or no; you have got to consider conditions and the machine; I am not familiar with but one machine and am not very familiar with that machine, but in the case I mention, the man who was using the machine made the mistake, after he finished milking, of running steam through the tubing of the machine. Now, this merely coagulated or dried certain particles of the milk and made them stick to the inner side of the tubing, and then some bacteria which remained there, which had not been brought intimately enough in contact with the steam to be killed, began to multiply so that, by the time the machine was used for the next milking, there were quite a large number of bacteria present in these tubes and of course they were washed into the milk, and then this man seemed to expect that the milking machine would do everything, he had not cleaned his cows, because he had not cleaned the udders; I saw places where the udders had long hairs on them, which is one thing I had not mentioned, that in keeping cows clean it will be found of very great assistance if the long hairs on the udders and flanks are kept clipped short; this will help very greatly in keeping these parts of the cows body clean. This man had not done that. The hair on the udder was quite long and the manure, when soft, had run down the ends of the hair and matted half a dozen of them together and when he put on the milking cup, he put it right up over the ends of those hairs. When suction started, you can imagine what happened to the manure on the ends of those hairs.

A Member: What would be the proper method of cleaning the machine?

DR. KLEIN: This manufacturer who put out the machine I spoke of recommended that after they were cleaned, they be put in lime water. In regard to cleaning, the same thing will apply to milking machines that applies to every thing else used for milk—they ought to be rinsed out first with water that is not too hot. It may be lukewarm or cold, but it must not be hot enough to dry or coagulate some of the substances that are in the milk and make them stick to the vessel. Use cold or lukewarm water first and then hot water. He made the mistake of using the hot water to begin with. If you go that far with the milking machine, the various manufacturers recommend different methods. The manufacturer of this machine recommended that after the tubes were cleaned, the rubber parts be laid in lime water. That seems to me like a very good arrangement, although I don't know that it has ever been tested thoroughly to determine whether it is absolutely effective, but when the milking machines were put out first some of the manufacturers recommended that after you clean the tubes, you lay them in a three per cent solution of formaldehyde. That would prevent the growth of bacteria in the tube but would be very hard on the rubber, and what is going to happen when the first milk is run through those tubes? Of course the tubes can be rinsed out with water, but can this be done thoroughly enough to remove this preservative? The most serious problem, I believe, in using the milking machine, has been found right at this point, keeping the tubes clean, but there have been a great many serious problems that have been overcome by inventors, and it may be that this one will be overcome. I do not wish to say anything against the milking machine because I have nothing against it, but as to saying broadly whether the best milk has been obtained with the milking machine or by hand milking, I cannot answer that question, yes or no, I can only say that a good, careful man can probably produce as good milk by hand milking as he can with the milking machine.

A Member: In reference to the handling of milk, in Lancaster, our home town, quite a number of our dairymen take good care of their herds, clean their stables and cattle and try to produce a high quality of milk. There is a milk company there that pasteurizes their milk, and I have been told that the good, bad and indifferent milk is all pasteurized together and the man who takes decent care of his herd, does not get any more for his milk than the man who does not. Now what inducement is there to be careful?

Another question I would like to ask is this—is pasteurized milk as digestible as milk that is not pasteurized? My physician tells me it is not. It is a question of dollars and cents with us. Plenty of farmers will take care of their herds of cattle and produce as good milk as anybody could wish if you are willing to pay for it.

DR. KLEIN: The first part of your question touches on the commercial side, and I am not discussing that subject, I am merely talking about the production of sanitary milk, now the marketing of sanitary milk is another question. In regard to the other point, as to whether pasteurized milk is less digestible than raw milk, I can say this, that there has been quite a few experiments made to determine that point and in the beginning, most of the experiments seemed to indicate that the pasteurized was less digestible than raw milk. That was because, in the beginning the milk was heated up to 179 degrees or in some instances was boiled. More recently however, it has been found desirable to heat milk to 145 degrees. Many believe to-day that this will kill all the disease producing organisms in the milk, although that point is not absolutely settled, but when milk is heated up to 145 degrees for thirty minutes, it appears to be just as digestable as raw milk.

A Member: It is as palatable?

DR. KLEIN: If you change from raw milk to milk that has been heated to 145 degrees for thirty minutes, you will notice a difference in the taste and you may not like the taste as well, but after you get used to that taste, you will not notice it; that is to say, you can become accustomed to the taste of milk heated in this manner just as well as you can become accustomed to the taste of milk that is raw, but there is one thing that must be remembered, pasteurizing will not make bad milk good. Bacteria in milk, that is, those that are not disease producing, are not objectionable because they are bacteria, but they are objectionable because of the changes they bring about in the milk constituents, they are objectionable because of some of the products they produce. Now then, if these bacteria have had an opportunity to grow in the milk and produce these products, it becomes a question then as to whether pasteurization is going to destroy those products, not whether pasteurization is going to destroy the bacteria, and it is by no means certain that heating milk to 145 degrees F. for thirty minutes will break up these products, the most injurious ones; and then there is one thing about the pasteurization of milk—the word pasteurization applied to milk has no particular meaning; one man may sell you pasteurized milk and it may be milk that has been heated to 145 degrees just for a minute or two; another man may sell you pasteurized milk and it may be milk that has been heated to 145 or 150 degrees for thirty minutes or even 50 minutes; they never go above this point, because if they do, it will destroy the cream rise.

A Member: Will there be any difference in the condition of ice cream made from pasteurized cream or cream not pasteurized? Will it change the taste or healthfulness of the cream?

DR. KLEIN: I could not answer that question; I know nothing whatever about making ice cream.

DIRECTOR MARTIN: The questions indicate that you are much interested in this subject, but we have overrun the time. The next topic is "The Horseshoe Considered as The Base of Support of the Leg," by Dr. John W. Adams, of the School of Veterinary Medicine, University of Pennsylvania; but it will not be fair to Dr. Adams to have him begin now and drop off at 12 o'clock, and we are up to two or three problems here: The afternoon session is pretty full and the courtesies of the people resident in Washington have been extended to us about 4 o'clock to take us on a trip to see some of the beautiful farms in this vicinity and visit the fair grounds. Now, what we want to learn is if the audience can return to this hall at one o'clock, at which time Dr. Adams will deliver his address, and then the regular program for this afternoon will follow? As many as can be here at 1 o'clock, hold up your hands.

(The major portion of the audience held up their hands and recess was taken until 1 P. M.)

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Wednesday, May 21, 1913. 1 P. M.

Mr. J. W. Stewart, Jefferson, Pa., Chairman.

The CHAIRMAN: Ladies and Gentlemen and Members of the Institute: The full program that we have for this afternoon in connection with what was left over from the forenoon, precludes the privilege of the Chairman uttering a word at the beginning of this session of the Institute. You know the Chairman often has to fill in time that nobody else can, and he has to do a good many things in this Institute work that nobody else can do. Permit me to say to the Board of Agriculture, however, that I appreciate the fact that this meeting is called in the City of Washington, being near to my home and the county which I come from, giving an opportunity for Greene county farmers to attend, the first they have ever had, in my knowledge. A number of them are present and will be present.

Let me say to you, just in a word. One hundred and seventeen years ago Greene county was a part of Washington county, the same people, the same race of people are residents of both sections. We are identical in many respects, the same race of people, the same soil, the same farm products and so on, and the only difference I could think of at present between a Greene county farmer and a Washington county farmer is, that in speaking of this separation, the Washington county farmer would say that Green county was cut off from Washington and the Greene county farmer would say respectfully that Washington was cut off from Greene.

Now, with these jesting remarks, let me introduce to you, first, Dr. John W. Adams, of the School of Veterinary Medicine, University of Pennsylvania, who will address us on the "Horseshoe Considered as the Base of Support of the Leg." I am advised to divide the time between these speakers this afternoon as nearly equally as I possibly can, so if I notify the speaker that his time is about expired, he will not think strange. I want to suggest right now that those of you who have any questions to ask. I want you to get up on your feet and ask them. I tell you that the time has passed, fellow-farmers, when a man can sit upon his seat and ask a question and not ask it very distinctly. Get up and speak out loud so that you can be heard, so that my friend here can get all the facts. I take pleasure in introducing Dr. Adams.

Dr. Adams spoke as follows:

## THE HORSESHOE CONSIDERED AS THE BASE OF SUPPORT OF THE LEG.

By DR. JOHN W. ADAMS, *Philadelphia.*

Mr. Chairman and Ladies and Gentlemen: I am quite grateful to the Chairman for putting me off until this afternoon. I was quite perturbed this morning when I felt that possibly I would have to say what I had to in about ten or fifteen minutes. I felt that I would be in the position of the Santa Fe railroad agent, if that were the case. They sent a young man from Pennsylvania way out to Arizona to take charge of a railway station. He was not familiar with the country or anything out there, and at the end of the first month, having received a shipment of a burro, he sent in his report, "One bureau short, one jackass over." I thought that was the position I would be in this morning.

I am to talk to you of the horseshoe regarded as the base of support for the legs. When I received the notice of this meeting, I was not misinformed, but I misinterpreted the call and thought I was to address a meeting of Institute instructors or teachers. Yesterday, however, I learned that I was to address a Farmers' Institute; then I realized for the first time that what I had intended to say was altogether too technical for this audience and therefore I changed the text of my sermon. Now you naturally would not expect much of a sermon after a change so recent as that; however, the University professors are supposed to be very versatile. I am a good deal like the servant of the old Scotch minister. He said, "Your reverence, I have been with you thirty years and have heard every sermon you have preached in that time and I think I could preach from any text in the Bible." The minister said, "James, what would you say to this text, 'The wild ass paweth the ground, and snuffeth up the air of the wilderness, and lifeth up his head in fury?"' He said, "I'd say it would be a long time before he'd get fat."

I am going to talk to you about the care of the colts and horses upon the farm. The ordinary layman's supervision of the hoofs of the colts and horses that work upon the farm is a very important question, because, during the first year of the colt's life, when the bones are growing, they are soft and, within certain lines, they are plastic and can be molded into those forms which they must retain during the rest of their life—the rest of the colt's life. Professor Meller, in 1881, while a professor at Stuttgart, showed, by experiment, that he could take a weaning colt and by leaving the outer half of the wall too long so that the outer half of the foot always struck the ground first and then was settled to the inner half of the foot, he could rotate the lower end of the long pastern to 10 degrees of the complete circle.

Now you know that there are three bones below the fetlock and two joints below the fetlock. The fetlock joint is a perfect hinged joint, so constructed that the long pastern, the first bone below the fetlock must extend and flex; in other words it must sweep in the plane of a circle, and that plane should always be parallel to the line of progression; in other words when you view the colt from the front, the legs should be perpendicular from the knee joint to the ground and those joints all flex and extend in a plane and that plane of flexion and extension should always be parallel to the line of progression. If that is the case, as you see the colt coming to you or going from you, the feet simply seem to rise and fall perpendicularly and drop perpendicularly to the ground. They swing neither inward nor outward, but if the colt's toes be pointed outward or inward, that means a rotation of all those hinged joints from the shoulder joints, therefore they flex and extend, not in a plane parallel with the line of progression, but in a plane which cuts the line of progression.

Suppose the toes are turned in, the elbows are out from the ribs—the so-called pigeon-toed horse—what is the flight of his foot as he comes toward you? The foot is raised from the ground, because the leg has to be shortened for the sweep forward, otherwise it would dig into the ground. It is raised from the ground and at the same time it is brought forward, and as the plane of the exing is oblique to the line of progression, the foot is carried forward and seems to sweep out during the first half of the stride and then inward to the ground during the second half, and that horse is said to paddle or wing out. When the toes are out, he flexes in carrying his foot forward and inward during the first half of the stride, and forward and outward to the ground, striking the ground on the outer toe during the second half of the stride, and is said to interfere or travel close; but the pigeon toed horse wings out, flexes outward, as he carries the leg forward and paddles, so it is desirable that the colt shall stand perpendicular, neither outward nor inward.

We know that they are often born with toes pointing outward or inward and we must realize that the colt whose toes point outward has too much weight on the inner half of the foot, that the inner half of the horn-secreting structure is relatively aenemic and grows horn more slowly than it should; whereas the colt that stands with his feet close together or pigeontoed, has a greater amount of pressure on the horn-secreting structure in the outer half of his foot, which is relatively anaemic and grows horns more slowly than it should; whereas, the colt that stands with his feet close together or pigeontoed has a greater amount of pressure on the horn secreting structure in the outer half of his foot, which is relatively anaemic and grows horn more slowly than it should. In either case, the side of the hoof that grows horn with normal rapidity soon becomes too long, so that the tendency of a splay footed colt is to develop too long an outer wall, and the more widely they carry their toes apart in order to gain a comfortable base of support, and this lengthening of the outside causes them, in traveling, to strike the outside first, the long outside, then the weight settles down upon the inside. The result of the weight settling on the inner half of the foot is to cause an absorption of the thin, sharp edge of the inner half of the hoof bone. The result is that the joint surface is no longer horizontal but is lower on the inside than on the outside, under the weight; as the long pastern settles down, it bears heavily on the outside of the joint and lightly on the inside, and the result is a twisting or tortion of the long pastern.

If you cannot follow me, all you need to remember is that so long as the toes point straight ahead, the bearing is evenly distributed over the joint surfaces of the fetlock and coronary joint and hoof joint; but as soon as you allow the outer walls to become too long or the horse to become pigeon-toed, or the inner wall to become too long, you get a joint that is not level and get a twisted pastern. If a colt becomes two years old with a twisted pastern, he's got it forever. Professors Meller and Longwitch, along about 1888, as I said before, experimentally caused tortion of the long pastern of colts; Professor Longwitch through 8 degrees and Professor Meller through 10 degrees, and then took other colts and twisted their pasterns and tried during the second year, to straighten them up again, and found it took about twice as long to straighten the pastern of a colt that had arrived at one year of age as it did to crook the pastern of a weanling colt that had arrived at one year of age with a bad standing position and crooked pastern.

You can still, during the second and third years, by judicious trimming of the foot, do much to correct the condition. If the colt is running on a sandy soil with its mother, the wear ought to be and often is in rapidity equal to the growth. Now colts grow about an inch in three months or two and a half months; in other words, about a quarter to a third of an inch in a month is the rate of growth of the hoof upon a sandy soil. The wear may be equally rapid with the growth and they may keep themselves perfectly level, but if the colt is stabled much or runs on a soft loam or in low pasture, it often happens that the wear is not as rapid as the growth and the hoof becomes too long.

What is the disadvantage of an extra long hoof in a colt? If we exaggerate, we can see what excessive length does in changing the shape of a hoof. Here is the hoof of a horse. This horse shows that the hoof has taken something life four years of growth. Here the hoof bone is taken out here and then he still stood on that part of his foot. The ground pressure on the long foot will always turn the toe up so that when the colt's foot becomes overgrown, it soon begins to become concave at the toe. At the same time, the frog no longer reaches the ground, because the horny growth only grows down a certain distance and stops. Just as soon as the frog loses all pressure, it does not functionate. As soon as the wall grows so long that the frog does not touch the ground, its horn secreting structure is bloodless and horn production is very slow so, in the long foot, we find the frog high up in the foot and the quarters curl in and cover over the space that should be occupied by the frog.

Here you can see where the frog is. There is the frog there, but down below, the horn has covered it over, so that long feet become twisted in various directions they become concave at the toe when viewed from the side, sometimes twist laterally, so that looking at the foot from in front or behind, one wall is convex and the other is concave. In either case, the long hoof exercises a very injurious leverage upon the ligaments which surround the joints of the leg below the fetlock; so that the long foot, by its excessive leverage and pulling on the flexor or middle tendon in the back of the leg, makes the animal's toe sore and he begins to cop or zuckle at the fetlock, so that the long foot produces zuckling at the fetlock, boney growths behind the coronary joint, lateral twisting will produce over-tension upon the lateral ligaments of the coronary joint, so that when your colt is four or five years of age, you will notice he has osalis or exos toe seats, bony outgrowths outside and inside the coronary joint, the result of a chronic inflamation of the periosteum or bone skin, and that has been caused by stretching the lateral ligaments where they are inserted in the bone so that overtension set up periostitis resulting in a bony outgrowth.

That is one of the bad results of this injury that a long foot always exercises upon the relatively soft ligaments of the joints of the growing colt, so that the man with a colt should observe from time to time, and if the hoofs seem too long, he should handle the colt enough so that he can pick the foot up and take an ordinary shoer's rasp and use the rasp, the rough side first and afterwards the smooth or file side; rasp the length of the wall down to practically its normal condition. He doesn't need to cut the sole; if the wall is not too long the sole will take care of itself. If it is too long, it is often associated with thrush, which is nothing more than a rotting of the frog, and as the frog rots, the quarters fall together and we have the beginning of the contraction of the quarter, and following, nearly all lesions of the foot, horns and quarter cracks and side growing and various other things that follow contraction, contraction being the result of lack of frog pressure, which is the result of the wall being too long so that the frog cannot touch it, so it all harks back to a wall that is too long.

A Member: Under what conditions does a hoof like that long one grow?

DR. ADAMS: I presume this horse was crippled and could not be used and was probably tied in the stall. This horse was never free to walk around on the pasture or the hoof would have shown more wear. I just gave this as an illustration of what ground pressure will do in shaping the foot. It tends to carry the toe upwards, so that here, for instance, is a colt's foot that has been shortened by the blacksmith, but shows already a contraction of one-quarter. Here are the two front feet; they have been too long but were cut down to the normal length. One has had some thrush and the hind quarters of both contracted; probably was too wide to start with. Here are two that are perfectly normal. During the second year, the same supervision has to exercised; the colt is getting older and heavier and the feet are gradually getting larger. During the third year, the colt is handled and frequently shod, but if the colt can go without shoes on the farm until he is ready to put on the market as a four or five year old, it will be better for his feet. I bought a pair of five year olds a year ago next June, half brothers—six years old I should say, and neither had had a shoe on, although they had been handled so they could be shod, and I assure you they have much better feet than if they had been shod earlier. Here are a pair of hoofs of a four year old that have never been shod, and looking at them, you might say they certainly are not normal in shape, but they are perfectly normal in shape; they are an elegant pair of hoofs of the too wide standing position. This animal stood with his toes wide apart, and that was the normal standing position with him and he has a pair of feet that exactly represent what that standing position should show.

And in this connection I want to mention—I want to go off of the beaten path a moment, and say that through the country and to a greater extent now through the city than formerly, the machine-made shoes are being used in place of the hand-made shoes. They are really cheaper; they are cheaper for the horse shoer, but not as durable. The hammering hardens the shoe, and a pair of well made hand shoes will last longer than machine-made shoes, but machine-made shoes unfortunately are uniform or symmetrical in shape and one branch is curved just like the other. Most of them are elliptical but of different sizes.

Through the country a draft horse of course has a foot like that (indicating) a round foot, whereas the trotting bred horses have a narrower foot. You send a draft horse to a shop to have a pair of shoes put on him and the shoer picks out the size that equals his foot in width and with very little fitting as a rule, if it is a busy shop. Those shoes are driven on, the elliptical shoe on the round foot, and the result is that the shoe is even at the toe and even back here in the widest part of the foot, or it is usually too narrow in the widest part of the foot. The result is that the shoe is nailed on and the wide part of the foot, the side wall, is dubbed off with a rasp down to the shoe, but behind you see how curved those quarters are behind the branches. Machine made shoes are too straight and the buttresses, the points where the wall turns forward to form the bar does not bear on the shoe at all or bears merely on the inner edge of the shoe, so that the heels glide downward or inward or are squeezed together and corns and contractions result.

Therefore if your horse shoer uses machine- shoes, insist that he heat them and go over them once or twice with a hammer to hammer them and shape the shoe to the shape of the hoof and then there will be no objection; but putting the cold shoe or the shoe without shaping on the ordinary hoof results in a very poor fit. It results in the wall being narrowed where it is too wide for the shoe and in the quarters receiving no support. Now here is a pair of feet of a horse that was not shod often enough. This horse came into the shop and his feet were pretty long. The shoer said he guessed he'd cut the shoes off first, so he took his saber and wooden mallet and started back here and simply cut off the shoes, hoof and all and then had a lot more horn to cut away before he had another pair of shoes on. He threw them in the scrap pile and I said, "I'll take those, they are a pretty good example of neglected shoeing;" so these two shoes were simply cut off the horses foot without drawing the nails at all.

How can the owner tell when his horse is properly balanced, that is when the outer and inner walls are of proper relative lengths? He can tell first by the wear of the old shoe. That is the best evidence we have of the manner in which the horse has set his foot to the ground during the period that he has worn that shoe. It is the record of ground contact, because the wear of the shoe occurs during the scouring or sliding of the hoof upon the ground. It is not the weight alone without motion that causes wear. The shoe will sustain a hundred thousand pounds if it is not moved at all, without wearing at all, but it is the sliding of the foot when the foot grounds and it is the sliding of the foot at the toe as the animal breaks over and gets away that causes the wear. If the shoe is wearing unifomly, no matter how thin, if one branch is equally thick with the other and the heel does not wear any faster than the toe, then we presume and we know that the foot must be set on the ground flat, so we say a horse is properly balanced when the foot comes to the ground flat, the inner wall and the outer wall strikes at the same time.

Here is an old shoe, it was a Fullard shoe, it's a right front shoe worn quite thin; all the fullering is worn out; that is the crease, just as thick on one side as the other, almost. That is a beautifully worn shoe, it shows that the horse has been setting his foot to the ground flat during the month. In dressing a foot down, take off as much on one side as the other. Here are a pair of horse shoes taken from a horse which had a rubber pad, and there is uneven wear. These two branches are much thicker than the other, the inner branches in other words are relatively thick and the outer are relatively thin. It means that the outer wall has been coming to the ground first and getting the first scouring, and that was because the wall was too long outside and held the shoe down too far. That is an indication, to be sure, after he has removed the pads and shoes and is about to level the foot, that he must take off more on the outside than on the inside, because it has been too long and held the shoe down, giving the outer branch the first scouring. If the shoer takes off the same amount inside and outside and puts on another shoe the branches of which are of equal thickness, the horse will begin to scour first on the outside. Here is a pair of shoes from which the owner got about all that was coming to him. It was originally a pair of shoes with toes and heels and when they were brought back, this is all there was to come off. The toes of the front feet had been worn away, heel corks, in fact the branches had been worn away. They were full shoes and yet the beauty about them is that they were worn as thin as scale and yet they are all there. That horse was traveling level, coming down flat, so the indication of a proper balance is the wear of the shoe. When front and hind shoes wear evenly, the foot is coming down flat, and where one branch wears much thinner or faster than the other, it is an evidence of one of two things; usually it is an evidence that the wall above the branch is too long and needs cutting down, or in case the horse is properly balanced so that his foot does come down flat, it is an evidence that the thinner branch is too far under the foot. A horse may be perfectly level, coming down perfectly flat, but if one branch is set out wide and the other under the foot, the branch nearer the bearing center of the foot is borne more heavily on as it slides along the ground, and wears faster. You take a bar of lead, we will say, a foot long, a bar of lead of equal thickness a foot long, and put a ten pound weight on one of the ends of the bar and a one pound weight on the other, and lay that bar and a one pound weight on the other, and lay that bar on a sandy surface and put your finger against the middle of it and push it along a hundred feet ,and you will find that the lead will wear faster under the ten pound weight than it will under the one pound weight. The bar has slid the same distance, both ends have slid the same distance, but one end has been under ten pounds of pressure and the other under one pound. It is the same way with the shoe, the shoe represents the bar; if one branch is near the center of the foot and the other far out from the center of the foot, the branch near the center bears more weight as it glides along than the other branch, and therefore must wear faster; so that, aside from keeping the feet of proper length and assuring an even wear of the shoes, there is very little that the farmer need pay attention to. Those are the two greatest injuries that can occur, the uneven wear of the shoe and the excessive length of the foot. I thank you.

The SECRETARY: I would like to inquire whether there is some remedy that can be reached by shoeing when one wall comes too near the center of the foot? What will you do in a case of that kind?

DR. ADAMS: Here is a pair of base wide feet. This colt stood naturally with his toes wide apart, and in that standing position there is always a tendency for the inner wall to be flat and to contract, in other words to come too near the center of the foot, and the question is, what can we do in the shoeing when one wall of the foot is too near the center to bring it out where it belongs? Well now, there are mechanical means of widening a foot that is too narrow. It is a general principle that, within certain limits, the wall always follows the shoe; in other words, if there is contraction of one quarter, I must set my shoe out full or wide at that point, because the tendency is for the shoe, if the hoof has something to glide upon out beyond itself it is coaxed out, but if you habitually set the shoe under, you will get a narrowing of the quarter, the horn will come in; so fitting shoes full coaxes the wall out within certain limits, and fitting the shoes narrow, coaxes the wall in.

Now, if there is contraction of one quarter or one side wall, that is if one quarter or side wall has its lower edge too near the center of the foot, we can also assure frog pressure, we can give the animal some form of frog pressure, either with the back of a bar shoe or with a rubber pad, and when the frog gets pressure, there will be a development of this fatty cushion of which the frog is a part, known as the planter cushion, and as the planter cushion develops, it drives the quarters apart and the posterior third of the foot becomes wide; in other words, we should see to it that the frog is functionating, that is that it gets pressure, that the planter cushion is fully developed. The mechanical means for driving the quarters out consist is using some form of spring, of which the best perhaps is what is known as the Chadwick spring, a V-shaped spring of round steel with a little brass ferrule to fit in the apex, which can be slipped backward and forward to weaken or strengthen the spring so it can be used for two or three successive shoeings. The points of the spring are set in full so they turn outward against the buttress. The hollow of the sole is filled with tar and oakum and covered with a rubber pad or leather sole and left on during that shoeing. A quarter of an inch or sometimes half an inch will be the expansion that will take place in the quarters during the period of one shoeing, four or five weeks, as the result of this mechanical use of the spring, but he won't need the spring if we do not allow the foot to become so badly mis-shapen.

With the first appearance of contraction, we should realize that the frog is not getting enough pressure, and see that the frog is left untouched, so that when the plain shoe is in place, the frog will extend downward an amount equal to the thickness of the shoes, and therefore will bear on the ground evenly, and that is a general principle to follow in the country. The frog ought always to be left prominent enough so that when a plane shoe is fitted to the foot, the frog will touch the ground when the foot is placed upon the ground. Horn should never be taken off the frog of a horse that is shod with the open shoe; it will expoliate, it will throw itself off in flakes when it becomes too long; it is only when we shoe the hoof with a rubber pad or bar shoe that we may have to cut the long frog down so as not to give too much frog pressure; so that fitting the shoes full at the contracted point and giving frog pressure or using some mechanical means such as the Chadwick spring are the measures indicated where there's a narrowing of the foot at any one point.

A Member: What do you do for a stumbling horse?

MR. BARNES: Are corns caused by the neglect of the horseshoer when he is the man that shod the horse? Is he responsible for the corns?

DR. ADAMS: Well, it is pretty hard to say that corns are always the result of the neglect of the horseshoer. We are misled when we think of corns on horses as of corns on our own feet, because a corn in a horses foot is not anything like a corn in the human foot. The corn in the human foot is nothing more than a thickening of the outer layer of the skin, the result of increased blood supply to that particular part, which is the result of friction or pressure on that part. Where the shoe works or bears on a certain part of the toe, the skin gets thicker and the pressure of the shoe presses that thickened part in and you have what we call a corn. A corn in a horse's foot is nothing more than the bruising of the tissue which secrets the horn, a bruising of the tissue, and that results in that tissue becoming somewhat thickened, it is true and every fresh bruising breaks some of the little capillary vessels and blood escapes and is imbibed or soaked up by the new horn, and when the new horn is pushed to the surface by newer horn underneath, we see the red staining which is an evidence of previous bruising. There isn't any thickening of the hoof over the corn, there is just a condition of local inflamation in the horn secreting structure down beneath the hoof.

There are great many causes of corn. Of course the flat soled horse is subject to corns. You must keep the pressure of the shoe away from his sole except along the margin. It is always permissible and it is proper to allow the margin of the sole to bear on the shoe. It always should, under all conditions, except when we apply two ounce or three ounce or four ounce running plates to horses; these bear just upon the wall and not upon the sole, but the sole should always be supported; an eighth to a quarter of an inch of the margin of the sole should always rest on the shoe; about an inch or so in from the white line or margin, the sole sinks a little bit, and if that portion strikes against the inner web or edge of the shoe, it will cause bruising; so in a flat soled horse we must be careful to widen and concave the shoe so that while it shall arch over the sole and protect it from bruising by stones, it shall not come in contact with it. Then, contracted heels, dried out, shrunk frogs, usually accompany bruising of the sole. The horse that has side bones often has corns on the same side, that is on the outer quarter. The shoer may not be responsible for the corns that accompany side bones, although, if he is careful and keeps the side that has the side bones down to its proper level so that the shoe will be worn uniformly, as a rule, there will be no corn upon that side.

A Member: Don't you think the average shoer burns the foot too much.

DR. ADAMS: No, I do not. There are two sorts of fitting, hot fitting and cold fitting. It takes a very fine mechanic to perfectly fit a shoe cold. Neither you nor I would be willing to pay him for the time spent in making a proper fit of a cold shoe. The horn is a poor conductor of heat, just as your hair is. You don't take a general anesthetic when you go to the barber shop and get your hair signed or have it cut, you haven't any feeling in it, and that's the way with a horse's hoof, he has no sensation or feeling in it, it is such a poor conductor of heat that you can take a dry sole a fourth of an inch thick and put a heavy shoe weighing a pound and a half at yellow heat upon it and it will be there four minutes before the temperature will raise on the inside, by tests. It is such a poor conductor of heat that it is practically no conductor at all. You can take the end of a horn and burn it clear up to your hand and won't feel any heat in it. Of course dry horn is a poorer conductor of heat than moist horn is. There is excessive use of the hot shoe, of course, but the only perfect rapid fitting is hot fitting. The shoer takes the shoe at a dull heat, having previously leveled the foot as well as he can with his eye and leveled the upper surface of the shoe, he drives the pritchel in the outside, to nail, places the toe in the center of the foot, bears down and takes the handle of his hammer and bears on the other branch to get an even bearing, and just as soon as it begins to smoke, he takes it off; then the high points that have been touched and have been scorched, he takes the smooth side of his hasp and lowers the high points that have been touched; then he puts the shoe on again and the scorched area covers more ground and the third time it scorches all the way around. That contact all the way around does not hurt the horse and he gets a perfect fit, so that proper hot fitting is the only true fitting.

A Member: Do you not consider it the worst practice for the smith to take his rasp, after the shoe is on, and rasp the foot to make it fit?

DR. ADAMS: Yes, sir. The outer layer, which we call the pariope, is represented in the watermelon by that dense glistening, hard layer on the outside. I remember a number of years ago Professor Barney told me, if you sand paper a melon and remove this cuticle, the melon rapidly loses moisture by evaporation and shrinks, and that exactly what takes place in the hoof when this pariople, whose function seems to be to prevent loss of moisture by evaporation, is removed by the rasp. It is only permissible to use the rasp on the horse's hoof as far as the clinches, not above, and when a horse comes from the shop with the rasp marks on the wall from the heel around to the other heel, clear up to the hair, it's enough to make the gods weep.

The CHAIRMAN: Doctor, we regret to announce to you that you have filled your time, and if any other member of the Institute has any question, let him write it and possibly we will have time to hand it over to the doctor later. Now ladies and gentlemen, we have, as the next number on this program, "The Agricultural Press and the Farmer," by Mr. Arthur J. Anderson, Editor of the Pennsylvania Farmer, Philadelphia.

Mr. Anderson's paper is as follows:

## THE AGRICULTURAL PRESS AND THE FARMER

By ARTHUR J. ANDERSON, *Philadelphia.*

Mr. Chairman, Ladies and Gentlemen: I wish to thank your honorable body for the opportunity to meet with you and present a few of the features of the relationship of the Agricultural Press to the farmer. The Agricultural Press is the pioneer in agricultural development work, and the farm papers have become so common and numerous these days, that I think we are sometimes in danger of overlooking the actual influence of the Agricultural Press in the development of agricultural knowledge and influencing actual farm operations. It may be interesting to note that there are at the presene time practically 450 agricultural papers published in this country. These agricultural papers include also the special papers, such as horticultural, poultry and bee publications and papers of that kind. But in spite of their numbers, they are probably among the leaders in influencing the actual operation on the farm. In order to save time, I have confined what I have to say on this subject to a paper:

*The Agricultural Press and the Farmer:* The agricultural press claims a position by the side of the Institute, the agricultural college, and the experiment station as a general educational factor. In fact the farm paper antedates them all. Before it was thought necessary to have special institutions of learning for the dissemination of agricultural knowledge, the farmers were drawing new ideas and new inspiration from the experience of their more enterprising fellow farmers, as told in their farm papers. Before experimental stations were established and before agriculture was recognized as a science, the farm papers were recording the results of practical experiments conducted by the most successful farmers of their fields, and formulating principles which have since been accepted as the basis of scientific truths. Our readers were getting the results of useful experiments, conducted under extremely practical conditions, and leading to successful farm practice, all recorded and occasionally illustrated in the pages of those early farm publications.

The farm papers were the forerunners of the farmers' institutes, and in many states the first institute speakers were men who had established their reputations for advanced thought and successful practice in farm management through their writings in the leading papers of the day. Even, I dare say, that many of you find a warmer welcome for your introduction to new audiences made easier when you have given your hearers the opportunity to say: "I have read your articles in such and such a farm paper." The colleges, experiment stations and the farmers' institutes are all the outgrowth of the agricultural development of the last sixty years. Farm papers have been more or less widely distributed in this country for the past one hundred years, and I believe that I can safely claim that they have held their popularity and maintained their usefulness fairly well during all of this time. Now we are to have the country demonstrators, the farm bureaus, agricultural highschools, and agricultural instruction in the rural schools. All of these are to take the field in the development and dissemination of agricultural instruction which the farm papers once held alone. One might well suppose that with these all fully established, there would be no further need for the agricultural press, but these papers have been one of the most potent factors in paving the way for these newer agencies, and they will continue to share the field with them in the future.

Just as the farm papers have made more and better agricultural students and larger and better institute audiences in the past by awakening interest and creating a demand for more and better agricultural instruction, so will these schools and demonstrations, as well as the colleges and institutes make more appreciative and discriminating farm readers. Any institution which works honestly and efficiently for the improvement of farm conditions will share in the demand and appreciation of such institutions. The primary aim of all of these agencies has been to assist the farmers in the general business of farming and in the development of the great industry of agriculture. A fair measure of success of each in attaining this end may be determined by the extent to which each has succeeded in actually reaching the man on the farm and influencing his farm practices; also by the value placed by farmers themselves upon these various agencies in improving their condition and assisting them in their work. I said that the farm paper has retained its popularity and maintained its usefulness fairly well in comparison with other established educational institutions. This claim is substantiated, though not necessarily proved, by the findings in an investigation recently conducted by the United States Department of Agriculture. You are no doubt all more or less familiar with the results of this investigation, if not with the actual figures. I present them merely because of their direct bearing upon the question at hand.

In order to secure definite information upon the effect of the work of the various agencies in influencing farm practice in this country, the Federal Department of Agriculture had a house to house survey made in four sections of the country, covering the East, the South, the Central North, and the Middle West. The route of the agent conducting the investigation in the East extended from the northern part of the State of New York, reached southward across Eastern Pennsylvania, touching New Jersey and Delaware, and extending across Maryland. In all, 3,698 farmers were interviewed. Each agent was supplied with a set of questions, the nature of which is indicated by the following of conclusions. Of the total number of farmers interviewed, about one in every 1.5 was found to take a farm paper; one in 2.3 receives agricultural bulletins; one in 3.3 attends farmers' institutes; one in 6.5 belongs to some agricultural organization; one in 14.5 writes to agricultural institutions for advice, and in the South one in 11 gets personal instruction from county demonstration agents. Of the farmers who received agricultural bulletins, attended farmers' institutes and took farm papers, 21 per cent. favored the bulletins as the most helpful sources of information on farming; 14 per cent. favored the farmers' institute, while 66 per cent. favored the farm papers. Even in the case of the small number interviewed in the South where the county agent system has been installed, only 11 per cent. favored the bulletins and 24 per cent. favored the farm papers. So far as this investigation can be taken to indicate actual average conditions, the farm papers still lead in reaching and influencing the actual farmers.

As students of farm conditions and being interested in all the agencies operating in the interests of rural development, the results of this investigation seem to merit some analysis. I do not believe that the indicated popularity of the farm papers over other educational factors necessarily reflects or is due to superior qualities in the papers themselves. The papers merely give their readers the latest and most advanced information on general farm subjects. Much of this is developed by these other agencies, and put into practice and adopted by practical farmers. The preference indicated must therefore be due more to the manner in which the papers present their matter and upon the measure of confidence which the papers inspire in their readers, than to what they present. A brief analysis of the methods of farm papers may therefore be interesting as suggesting some fundamental principles which may well be kept in mind these days when so many efforts are being made to educate, assist and otherwise stimulate the farmers and the rural communities.

One of the first essential features of the farm paper is the fact that the farmer must pay a price for its service. The price is small these days, and it is sometimes made with a combination of premium offers which make the actual investment ridiculously small; but nevertheless it represents an investment, and having paid his money, the farmer feels that he has a legitimate claim upon the services of his paper, and he uses it. The Government and State bulletins, as well as the institutes and, in some cases, the county agent, lose some of their value in the eyes of the recipient because they represent no direct outlay of money or effort to secure them. The bulletin, for instance, which comes unsolicited and unsought, lacks the personal appeal which insures appreciation.

I believe there is a positive danger in the new county agent movement in this same connection. No one can reasonably doubt the possibility for good in the movement if it is rightly conducted, but to fill the field and accomplish results, the call for the demonstrator must come from the farmer and not from his city friends, the State or the Federal Government. When the farmers are sufficiently interested in the need of a county demonstrator to request his appointment, and when they will dig down in their pockets for the money to employ him and maintain his office, they will use his services and demand a commensurate return for their money. Under such conditions the farm demonstrator system will succeed.

Another feature of the farm paper which makes its appeal to the practical farmer is its timeliness. It comes to hand when most needed. A handicap which you institute men must meet each year is the fact that your talks with farmers are so removed from the season of actual application of your suggestions. You may do your very best, but at the most you can only send your audiences home with renewed inspiration and a few fundamental principles which your most attentive listeners are able to retain. You have done your duty, but you have no assurance that your hearers will retain your suggestions until the time when they can put them into practice. Here the farm paper has an advantage over you. It is on the job the year around, and can plan its most valuable features to appear just in advance of the time when they are most needed in practical work. You may have given exactly the same information in your institute talks the preceding season, but by the time the farmer is ready to make use of the information your talk will have been forgotten, and his farm paper gets the credit. Let me drop this suggestion: If you have a real message pertaining to special farm practice and you really want to get it to your fellow farmers in a way and at a time that it will soak in to stick, preach it first in your institute talk, but give it later, when it is most timely, to the agricultural paper which your fellow farmers are reading.

A third feature which I think is fairly well represented in the general farm papers today, but which may be further applied by the press, the institute and the bulletin, is the practical presentation of a subject. In the farm survey to which I have referred, of the 3,698 farmers interviewed, 1,616 or 43.7 per cent. said that they believed that practical experience is the safest guide to farm practice. There is a big lesson in that demand for the practical. The farmer may listen to theory and admire argument, but there is no class in business today that will apply the acid test of practice more rigidly or keenly than those who earn their living from the stubborn and mysterious soil. We may talk of the rapid advance of the farmer in grasping the vast amount of scientific knowledge now being hurled at him. He is making rapid progress, and his opinions as well as his understanding of "book farm" information is rapidly improving, but nevertheles a very large amount of the matter now being directed to his attention is figuratively "shooting over his head."

Experiment station literature praticularly, must, of necessity, deal with scientific facts in language not readily understood by farm readers, but the most useful are those which get away from technical and involved phraseology as much as possible. Many a station bulletin defeats the purpose of its publication because it confuses truth in the minds of its readers rather than elucidating it. Let a farmer tell the story of an experiment station problem in his own words, and in the words of his readers, and he will make more converts and create a more lasting impression, and therefore a more valuable one, than could be obtained by a half dozen readings of that same bulletin. The station literature gains in poularity and usefulness in being retold in the language of the agricultural newspaper writer, and in application to actual conditions on the farm.

This fact is very nicely illustrated in the case of at least one station authority of my acquaintance who conducts a regular department for a leading farm paper. He handles a large number and a wide range of questions in general farm practice from the readers of the paper. In making his replies, he supplements his practical experience with facts which have been developed by various experiment stations which have conducted tests on the questions at hand. His replies carry much of the same information which is available to the farm readers in published bulletins, if they would but use it. The bulletins remain unread, yet when told by this man in the language of the farm reader, and when applied to specific cases, the information is not only accepted at its full value, but it is put into use in the actual operations of the farm. And here is an added fact which points its own lesson: This man's service is immensely popular with the farm readers, and the station authorities have observed that this service has increased the popularity of the station and increased the demand for direct station counsel with the farmers of the State.

In making this analysis of what I consider the favorable features of the agricultural press, and in attempting to point out some of its practices which might be used by other agencies, I do not want to be understood as maintaining that the farm press is not without faults, or that it is all that it should be in present or past make-up.

There have been great improvements in the general quality of our leading farm papers in the past twenty years, and perhaps they have shown as great progress as other agricultural institutions. But there must be even greater improvements in the future. Past methods and the concentration of effort on a few lines will not suffice under the conditions which we may reasonably expect to prevail in the future as a result of present interest in agricultural educational work. The agricultural papers of the past have not shown the qualities of persistent active leadership which their readers have the right to demand of them. Too many have been satisfied to simply keep abreast of their time, reflecting advances in the agricultural industry as they have been developed, instead of being actual leaders in that progress and pointing the way to new accomplishments. They have attempted to hold popularity by too much of a follow-up policy instead of earning popularity and establishing real worth by actual accomplishment.

The value of the public press as a champion of a worthy cause has been proven time and again. We can all point to certain daily newspapers that have won places among the great national powers in shaping and influencing national policies and in leading in the accomplishment of worthy causes. Some of our present day dailies are making their influence felt in the same way. In the great special problems facing the agricultural industry of today, and in presenting the just claims of agriculture as related or opposed to other great national interests, there is need of just such leadership in the farm press. Perhaps it is too much to ask that a single farm paper, with a restricted or localized circulation, shall ever make such leadership effective over a large area, but the combined influence of all of the leading papers in the interests of a common cause would give the industry the representation which it must have in the future. Let us suppose that all of the farm papers of this country had combined in an effective fight against the Canadian reciprocity pact which was enacted in Congress two years ago. Suppose that each paper by persistent presentation of the actual provisions and application of that measure influenced one-third of its subscribers to direct a personal protest to their political representatives against it. The result would have been one of the greatest industrial demonstrations ever made in this country, and would have established the relative importance of agriculture in the country's interests as nothing else would. It would have insured the consideration from Congress for a period of years which the industry deserves. It is leadership of this character which the farm readers have a right to expect from their farm papers, and which they will demand some day in the future.

We are learning to realize that agriculture is more than a profession; more than the mere production of crops. It is a life, the most vital of all industries, a great teeming, living world with special interests in the field of state and national legislation and with special problems as broad and as varied as human life itself. As representatives of such a life, and as champions of the farmers' cause, the farm papers of the future must branch out in individual effort and show more unity of purpose in their consideration of these interests.

We are all familiar with the oft-repeated assertion that agriculture is the greatest wealth producing industry in this country; the keystone of National prosperity. Yet in practically every instance in which agriculture clashes with the other great National industrial, agriculture is sacrified by the very men who eulogize the farmer, and advantage is given to the other interests. In questions of taxation, special legislation, industrial privilege and the ever-troublesome tariff rates, and rights and welfare of practically every other industry are considered first and agriculture takes what is left and is expected to adjust itself to the new conditions as best it can. There is a logical and very practical reason for this. The agricultural industry lacks the concentration and organization that is enjoyed by the other industries and is unable to bring concerted action to bear to present its just claims and grievances. Through lack of leadership and organization the farmers have never been able to present the full power of their combined numbers. The day of organization is promised, but in the meantime the farm papers can do much to concentrate public opinion and direct organized effort in securing the desired results.

One of the first requisites to every successful paper, whether it circulates in the city or on the farms, is that it [illegible] confidence of its readers. This presupposes a number of very important conditions, and it is going to require more in the future than it has in the past. The farmer of the future will be more the reading farmer, and reading more, he is going to be more discriminating and exacting in his selection of papers and in what his papers give him. To command the confidence of such readers, the papers must build up a reputation as authorities upon the matter which they handle. This means that the reading column must be under the supervision and censorship of men who are equipped with practical experience as well as scientific training to be able to discriminate between the safe and the unsafe, the truth and the untruth. The material must be drawn more and more from the acknowledged leaders in farm practice, and those who have demonstrated the value of their counsel by success in actual accomplishment. The most useful farm papers today are those which are drawing their matter most largely from the leading farmers of their own field, and are keeping in close touch with the actual needs of their readers. In the future, there will be even less matter written in the office, and more from close contact with the actual work of the farm.

Another requirement of the successful farm paper in the future will be the enlargement of its field. The papers of the past have specialized almost exclusively in matters pertaining to the production of crops. Along with other similar institutions they have assumed that crop production is the chief aim of farming. Following this assumption they have discussed production methods with every known farm crop year after year with little change in fundamental principles but depending merely upon a new setting to give spice and variety. The first issue of one paper with which I am familiar, published in 1848, contains a number of articles on crop production which in general features are no different from articles appearing in dozens of farm papers today. The useful farm paper must continue to discuss production methods, but it must also find space for other and equally important farm interests.

We are at present face to face with the greatest economic question of better marketing. We have learned and are continuing to learn how to make two blades of grass grow where but one grew before, but we have yet to learn how to make the two blades yield double the return in worldly goods or comforts of life that the one did before. We are just starting to investigate the principles and availability of cooperation and the possibilites of self-help through mutual help. The country is awakening to the fact that in our present wasteful system of marketing we have one of the greatest economic wastes of the age. It's unreasonable to suppose that this condition will be permitted to continue. A remedy will be found. If it is not developed by the producers, it will be by the consumers of their representatives. If developed by the cities, the remedial measures will all be shaped to suit the cities' needs. If remedied by the producers, they may hope to receive some of the benefits and advantages of such a reform. This question will be of vital interest to farmers in the next few years, and the farm papers must give it ever increasing attention.

With united effort in the solution of these problems must come organization and a closer combination of farmers. The community is the logical unit of successful cooperation, and there must be increased interest in those things which go to make up better community and better home environment. Under the conditions prevailing in rural life, the rural home must ever be dependent to a large degree upon the spirit and tone of its community. The social, school and church conditions, which make a community a better place to live in, make it also a better place to invest money in and a better place to farm in. The improvement of these conditions are economic as well as social problems which are vital to rural prosperity and happiness, and they must eventually find an important place in the attention of all farm papers. Farm papers are now going into practically three-fourths of all the farm homes of this country. In many of these homes they are practically the only current publication taken. If they even approach the limit of their usefulness, they must be faithful representatives of the best interests of these homes.

There are a number of minor improvements which will eventually come as a result of a better understanding of farm readers and greater attention to details. For instance, the style and quality of workmanship will improve. For years little attention was given to the quality of paper, perfection of presswork, and selection and clearness of illustrations which all go to make up the appearance of a publication. The publishers assumed that the farmer placed no value upon these features. This assumption is rapidly being displaced, and we may soon see the farm papers comparing favorably with other technical journals in the style and quality of their appearance as well as in general wormanship.

Another feature is the class of advertising matter handled. There has been a great change in this respect in the last few years, and publishers today are refusing space to advertisers who were never questioned a few years ago. They recognize that they owe an important duty to their readers in keeping their advertising columns free from matter which would deceive, defraud or injure their patrons in any way. I believe that this practice is general with all farm papers at the present time. No reputable paper could afford to accept advertising which would make dissatisfied readers, and I am sure that the advertising columns of the agricultural press are as free from such matter as those of most other classes of publications. If a fraudulent advertisement creeps in, you may be sure that the publisher has been deceived, and he will be the first to remedy the error. But there are still some things to be desired in this respect. Publishers are even now going beyond the mere question of honest dealing, and are satisfying themselves as to the actual value of the advertised goods, the specific claims of the copy, the fitness of the articles offered and the effect of the presentation of certain classes of advertising upon the members of the reader's family. The future will find cleaner advertising columns and even a higher standard of advertising merit.

In making this brief summary of the present and future of farm papers, I must confess to a more or less biased viewpoint. We are told that when we think too long on one side of a subject we are in danger of falling into a rut and becoming cross-eyed in our view. If we have conceived a cross-eyed vision of the future of the agricultural press, it is due to an over-confidence in the accomplishment of the ideal. I believe that most of the farm papers today are making a serious and conscientious effort to reach this ideal, and spurred on by the increasing demands, they will branch out and develop as efficient leaders in the great industry which they represent. You and I know that it is the greatest industry in the world today, and it will continue to be so for many years to come. If I am expecting too much of the future development of the industry, I am merely indulging in the general optimism so characteristic of farmers everywhere.

I like the sentiment of the posters which were displayed in many of the rural communities of Ohio, following the recent flood. It expresses the real spirit of the farmer as he meets the uncertainties of Nature and her various moods. The people who could express such sentiments after such a visitation of flood and disaster must inspire the confidence of the leaders in agricultural work, whether they be institute men, college or station workers, or directors of the agricultural press. The posters read:

"We've had our time of flood and gloom,
We've neared the awful gates of doom
And some have entered in.
But now the sun of hope peers out,
Old troubles we can put to rout;
So grin, gosh dern it, grin!"

The CHAIRMAN: Ladies and Gentlemen: You are differently constituted from what I am if you don't get very tired in three hours sitting and listening to entertainment as is usually the case in these normal meetings, and I am going to make a suggestion to you. I will hold the watch on you, if you will stand up for two minutes to rest yourselves a little while those doors be kept open to let in the fresh air.

(Short recess.)

The CHAIRMAN: I have the pleasure of introducing to you, Mr. H. M. Collingwood, Editor of the Rural New Yorker, who will deliver an address on the "Citizenship of the Farm."

Mr. Collingwood's address is as follows:

## THE CITIZENSHIP OF THE FARM

By H. W. COLLINGWOOD, *New York City.*

Mr. Chairman and Friends: I am no orator, and you will find it out before I go very far. I don't pretend to be a scientific man, and that will be evident also; and I know a lot of men who are neither one nor the other, but they lack the ability to realize it. Now, I think I do. I am going to talk in a plain, off-hand way to you, good friends, and tell you the things that I believe, that my life and my experience make me believe, for I have learned that it is better for a man to come straight to the front and say the things that he believes are true and stand by them.

I was brought up on Cape Cod, by a man who was called pretty close by his neighbors, and when you get a Cape Cod neighborhood to call a man close, you can make up your mind that he is close. That's right. I remember how, when I was twelve or thirteen years old, whenever I took a ride on the railroad train and the conductor came in the car, that man would pat me on the shoulder and say, "Scrouge down, make yourself just as small as you can, so he will think you are under age and I won't have to pay your fare;" and I confess that I did it, and I passed for a number of years, as a very small boy. I never liked to do it, but I did it. Years afterwards, I went to a public hearing where a great railroad corporation came and demanded the right to put an increase on their passenger fare, and a great lawyer got up and made his argument: "Gentlemen, we have got to have a big margin on this thing, because these farmers try to cheat us." And do you know he went on and told that very case of a boy that scrouged down and cheated them out of half fare; and I kept my seat and couldn't get up and say one word in reply, although I know they had no right to the increase in their railroad fare, but it took the whole heart out of my argument to know that what that man said was true. Now, I am going to talk plainly; I am going to say just what I believe and I am going to say it, I hope, so that you will know what I have been talking about.

In the first place, my friends, it might be asked, Why there should be a special citizenship for the farmer. I find that whenever a farmer makes a demand for what he believes to be fairly his rights in business or in politics, he is generally met with the statement that he has no right to expect anything more than other people receive. The farmer does not ask anything more than others deserve, but he has the right to ask a square deal in business and society. It frequently happens that he cannot obtain this square deal except through particular and peculiar ways of getting hold of it. A little thought would show why this is so. The farmer lives a life different from that of any other citizen. His home and his farm is a little community by itself. A man working in a town factory, or a man running a store, is a small part of a big machine, a cog in a large wheel. It follows therefore that law and social habits which take care of this big wheel, usually take care fairly well of the little cog. A farmer on the other hand, instead of being a cog in a big machine, runs a little machine of his own. It may be a small machine, but it is pretty much the whole thing as a machine, all the way from the motive power down to the little cog; being located right on the man's farm. People do not always get this distinction between the two. The town man is a little part of a big piece of machinery; the country man is the entire proposition of a small, complete machine.

Not only is that true, but in his relations to society, the farmer is on a different basis from the man who lives in the town. The town man is a consumer and handler. He rarely, if ever, gets his hands down to the real foundation of things. He takes the things which have originally come out of the ground; makes them over into different forms, and sells them in the market. To put it another way, the farmer feeds the world, while the man who lives in town waits upon the world, runs its errands, and serves it in various ways. We want to get this thing firmly in our minds, that the man in town runs upon the errands of society, while the man upon the farm is an independent producer, not merely running upon the world's errands, but providing those essential things without which society could not endure for a year. The men who do the work in our towns and cities might go on a universal strike. That would not mean death to the Republic, although it might be inconvenient, for so long as food and fibre were produced out of the soil, men would find some way to get hold of them and fix them so that they could eat them or wear them. That has been so through all the history of the world; so long as the essential things of life were produced, men have found the way to distribute them. But let the farmers of the country or of the world go on a universal strike in like manner and refuse to produce an ounce of food or fibre beyond what is needed in their own families, and we would have a very different situation.

Then there is another thing. In all the history of the world it has been a part of accepted belief that the farm or the country is the foundation of the health and the vital force of the Nation. This has always been so from earliest times. Just so long as the farmers of a Nation were happy and prosperous, and able to provide what they felt was needed in their home, the Nation itself has been strong and contented. The cities are recruited in each generation from the farm. If there were no farm boys and girls to bring fresh vigor and health and strong rich blood into these towns and cities, the civilization of the city would die out in three generations.

I could give you a hundred instances from history to show how this has always worked out in the same way. You may take one, the history of Rome. For many years Rome ruled the world. That was when the city was comparatively small, and when it was dominated by the farmers and small free holders of Italy. So long as these men controlled public affairs, Rome was safe from invaders. There came a time finally when habit and custom of the city changed, and the Romans reached out to conquer the world. There was a curious thing about the way they did it, for the Roman conquest meant simply the building up of large cities. In all the history of that time it cannot be found that the Romans ever extended Agriculture or farming. They had no use whatever for a farm except that it might produce soldiers for the Roman army, and food for the cities, the farmer himself being regarded as an inferior man. This became the national policy, and it was only a question of a few generations before the entire character of the Roman people was changed. Slaves and hirelings did the fighting. The soldiers had no patriotic or home feeling, but they were willing to fight for the tyrant who would pay them most. There came a time when the true Roman soldier got so lazy that he wouldn't even carry his weapons. He would fight with them, but he hired a slave to carry them on the march and take care of them. The slave began to practice with the weapons, and with the strength that he gained by carrying them about from place to place, he was able in time to defeat or kill his own master, and became the soldier in turn.

That has been the history of every nation where the small freeholder of land, or the farmer has been neglected, or has not received his fair share. A century or two ago the English army was largely made up of stout young farmers from the country, and a certain standard of size was adopted. Then came the land policy of England which made it difficult for the small farmer, or what we know as the hired man, to obtain land of his own, and there came a rush of able bodied men to the town and the city, and across the ocean to America and Australia. At the time of the war with the African Boers, I am told that in order to fill the ranks of the English army it was necessary to reduce the requirement of size by one inch in height, as it was impossible to find the larger men formerly taken as soldiers. In other words the English farms were not breeding and producing the men which were produced a century ago under a fairer share for agriculture. I think that one chief reason why the English land laws are being changed so that it is possible for these smaller farmers to buy farms, is because the statesmen see the absolute necessity of making their farmers realize that they are to have a fair show with other industries.

And there is another thing: You cannot, to save your life, mention a great reform or a great moral awakening, which has not started and developed from the country. You may take the slavery question, or any other great moral development in this country, and trace it back to its beginning, and you will not find one which was originated and carried on exclusively in the civilization of the town. They have all been started and developed amid the silence of the hills by farm-bred men. They have not started in palaces or in great factories, but in lonely farm houses, or in barns where men and women not only had time for thought and for reading, but were close to Nature, undisturbed by small attractions and capable of realizing the meaning of large issues.

Take it therefore from any point of view you please. The production of wealth, the keeping up of the Nation's health, or the moral power which stands at the basis of it all, and the farm home stands at the foundation of the whole proposition. You may tell me that there are some farm homes wherein none of these things are to be found. For the sake of argument, I would grant that may be true as an individual, but as a general proposition, putting society into classes as we find it, it cannot be disputed that the farm and the farmer who lives upon it stand as a foundation of those things which we most desire in the future of this country for the comfort and the hope of our children.

These things being so, we are justified in speaking of a special citizenship for the farm. First of all, our farmers must realize that during the last 50 years we have had a tremendous development in all lines of industry. Much of this development has directly affected the city and the town, yet it has indirectly affected the farm as well. If 50 years ago I had gone to the old gentleman who brought me up on Cape Cod, and told him that I should see men flying about in flying machines, that I should see gasoline engines coughing their way along the road, or doing the work of the farm, or if I had told him the possibilities of the telephone, I am very sure that he would have taken me out behind the barn with a stick, that he might drive out the evil spirit. Yet these things are here, and looking back over half a century we hardly know or when they came. Having seen this development, we cannot expect to be justified in telling our children that all development has stopped. The truth is that 50 years from now those who follow us will look back upon this period in which we live, with a feeling of wonder that people could really have enjoyed life under such crude conditions as we find today. I could name a dozen things which I am confident now seem absolutely impossible, but which our children and our grandchildren will accept as matter of fact, just exactly as we now accept the telephone, or the automobile. This being so, the farmer should recognize the fact that he cannot hope to influence the world. and his country with any narrow or bigoted citizenship.

Yet there are several essential things which must never be given up, and which I believe can only be kept purely alive in the country. In the first place, the farmers must learn to co-operate. We have to learn how to come together with other farmers and other producers, organize our forces and get away from the selfishness of individual interest. This one inability to drop prejudice and pick up the principles of co-operation has, I believe, done more to hold us back as farmers, and deny us all our fair share of what belongs to us, than any other single thing that you can mention. The trust and the big combination in the town and city have learned the value of organization, and the men who work for them in the city and town not only feel the influence of this strong organization, but they have learned how to organize themselves into companies, and armies, so that they are able to protect their rights. If you will think for a moment, whenever your butter, your potatoes, your beef, your wool, or whatever else you may produce, leaves your hands, it immediately, through all its courses, passes into the hand of an organization or trust, of some kind. The railroads are organized, the express companies likewise, the truck men who take your produce away from the railroad, the commission men who handle it, the wholesalers who take it from the commission men ,and the retailers who handle it from the wholesalers, all are organized. You are the only one all down the long line who is trying to put the force of your feeble individual hands against this organized body of men. And so therein lies the great fundamental principle of true civilization for the farm, for if you analyze true co-operation, and get down into the principles of real organization, you will find what there is of business, patriotic feeling, and of real religion in the outcome of your life.

We shall be forced in this country to have an overhauling of both business and patriotic feeling. It ought to be evident to any farmer by this time that just so long as he tries to imitate the meanness, the dishonesty, and the grafting methods of the big interests in town and city, he will be placed more and more at a disadvantage, because those men are better able and better qualified to handle the game of graft, and to get more than their share by tricky means. The evils which afflict our country will continue to exist just so long as the farmers of this land try to imitate this meanness and graft of the people who have robbed them so long.

I have said that every nation naturally looks to the farm home for its moral strength and its physical strength as well. In like manner, have you ever stopped to think that the nation must look for its business and political reform in the same way, to the influence of the country people? I have said this thing to farmers before now, and had them reply that they are obliged to fight the devil with fire and carry on the methods of business which they know are hurting them in the city. It seems to me that this is a most foolish and short sighted policy, for I can tell you that the great majority of men who are doing business in this country would like to be straight and clean and will gladly follow any business reform that is based squarely upon the principles of the Golden Rule. And I would go so far as to say that this reform can only come out of the country, as every other reform has done.

The first element of any citizenship of the farm therefore is one of straight, square, honest business dealing in every way. I hope to see the time when it will be recognized as the meanest kind of sin to put rotten and wormy apples in the middle of a box or barrel, or to stuff any package offered for sale with inferior goods. I talk in this plain way so that we may clearly understand whatI mean. As a boy I was brought up in a Yankee town, where it was thought to be smart to cheat your neighbor. I know of a man who went to the village store one Saturday and raised a great outcry. He pulled a stone weighing about two pounds out of his pocket, and was ready to take oath that he found it in the middle of a bag of coffee which he bought the week before. The storekeeper looked at it and said, "That's right, I found that stone in the middle of the last tub of butter you brought in here." As a child it seemed to me remarkable that those men could not see anything but the smartness of such practice, and could not realize the sin of it.

As a foundation for my citizenship for the farm, I would teach our boys and girls, and our grown up people as well, that the first principle of honorable business dealing with our neighbors or with the public, is to regard the man who will wilfully cheat another in the sale of his products as a fit companion for the saloon keeper. You may say this is hard language, and that there is no one here who needs any such reminder. If the latter saying is true, I rejoice to hear it, and am glad to know that you have such a remarkable community. But seriously, this business reform which our country needs must, in my judgment, start from the farm, and it must start with the individual, the man, the woman, the child, who at the last analysis, is the unit to start the Nation's business away from the land. Here is a reform which we, my friends, you and me, individual farmers, may start and carry out.

Another corner-stone of our citizenship should be true patriotism. I do not mean the patriotism of the dollar, but I mean that kind of patriotism which, some fifty years ago, came to our parents as a real test of duty. We need a revival of Americanism in this country, and have got to have more of the spirit of those people who left their homes in the old country or in the older sections of this land, broke away from old associations and made their way into the wilderness that they might have a home, for the home feeling is at the bottom of any worthy brand of patriotism. I wonder if you people have read that story of the Octopus, the story of a railroad robbing the people? There is a character there of a German called Bismarck who came there from Germany to make his home, and Bismarck, in his broken dialect, said, "Gentlemans, this country no good; I go me back my fadder land, I no stay me here; I go by the fadder land." Says the man, "What is the fatherland, Bismarck?" "O, the fadder land? O well you are marching along in Germany, your gun by your shoulder and you hear the band play the march mit the Rhine and the flag goes up on the mast like that and you feel in your heart, 'I wish I could run and fight with the enemy.' That is the fadder land." Well, time went by and Bismarck met an American girl. He married, built a little home of his own, and strange as it may seem, he came up to the land office to take out his papers as an American citizen, and a joker punched him in the ribs like that and said, "Bismarck, what about the fatherland now?" The man looked at him as though for the first time he realized what he was doing. He looked at the people around him in his slow German way, and held up his hand and said, "The fadder land? The fadder land? You ask me where is the fadder land? I tell you. Where my home is, where I may work mit my hands to earn the bread for my wife and for my little ones, where I build the roof that shelters them, there is the fadder land."

I tell you, my friends, that that poor ignorant German had in his heart the true philosphy of living; that's all there is to it. Where my home is, there is the fatherland, and when we can get our farmers in Pennsylvania and in this country to have that same thing in their hearts, that home, home, home and what it stands for is there, all there is to it, then we shall have our citizenship of the farm which will be worth all the dollars and all the power and all the business which has been piled up in your cities and in your towns.

Some of you who are rich and think you are great may tell me that the future of Pennsylvania lies in the vaults of Pittsburg, lies in the great banks in Philadelphia, lies in the power of your State House at Harrisburg. You are wrong. You are so foolishly wrong that I wonder at you to make such a statement. The future of Pennsylvania lies in the hands of the little children who are playing on your streets today and playing on your farms at home. The future of this State lies in their hands and in the mental pictures which they are drawing of father and mother as man and woman. Some of us grow foxy and perhaps do not feel the necessity for labor that we did in other years, and the home does not seem to us what it did when life was younger and when it was necessary to toil through the long and weary day for shelter and for food. Prosperity ruins far more people than adversity ever did, and there is danger in the vast accumulation of wealth in this land that we shall grow away from the simple and homely things which are the real foundation of patriotism and national strength.

We owe a duty to our children, but they owe their duty to us as well, and in the country of all places the child should be brought up to honor his father and mother, and to reverence his home, and, of course, it follows as natural logic that if the child is to honor father and mother, father and mother themselves must be worthy of the honor, and they will be worthy and they will make their worth known if they will grasp these simple primary truth of life, for the best and highest patriotism is that which gives its generous sacrifice in worthy service. For let me tell you my friends that the great evils which have grown upon this country, and which we all recognize and deplore, will remain and grow worse until we buy them, and thus acquire the right to kill them off. We must buy them, buy them with our own labor, buy them through our own sacrifice, buy them by doing things which may be unpleasant, which may be hard, but which represent our little part of a great big penalty which the Nation must pay in order to be rid of the evil. We must buy these things and pay for them out of our own comfort, or out of our own prejudice before we can acquire the right to kill them off.

And the final corner-stone of the farmer's citizenship, as I view it, is a broader and more charitable view of life. We have lived in the past too much to ourselves. Many of us have fallen into the way of thinking, that when a man falls behind in the race it should be a case of the devil take the hindmost. You and I know how, under the modern system of rush and power, we scramble over men's shoulders and crowd them back in order that we may win the highest place. I think we are coming to the period when we shall recognize the futility of working in this way. We shall see how our little bit of success gained through the sorrow or loss of some one else is an ill gotten gain, putting us further down the scale of morality as we have climbed a little higher up the scale of prosperity. This works out all through society; we find it in our farm education as elsewhere. Those of us who have been granted the privilege of a little look into knowledge, and a little help at scientific thought, know how impatient we become with the faltering and the slow, or with those who are held back by prejudice or long years of slow inheritance. A college boy may go out to teach a district school. He is ambitious to keep up with his class. Let us say that he has one student who wants take Geometry and French, while he has a dozen little ones who do not know how to read. It as a fearful temptation for the young man to spend most of his time with the student in Geometry, and to ignore those stupid little fellows who cannot tell *a* from *b*, and yet it is his duty as a teacher and as a man, to help those little fellows out of the store of knowledge which society has given him.

In our agricultural education, which I believe to be the corner stone of farm citizenship, we are in danger of following the mistake of that school teacher; it is natural that we should want to associate in thought and in speech with the quick and the bright, with the strong and resolute, and to let those of slower mind or prejudiced views seek their own course. But the problems of the farmer are not worked out in that way. We cannot afford class education any more than class legislation, but those of us who pretend to be teachers, and to whom the state has given strength of thought and education, must feel that the slow and the prejudiced after all demand our best work and our kindliest sympathy.

DIRECTOR MARTIN: I just have a word to say before Mr. Zinn begins his address. We have been invited by the local management, Board of Trade and other good friends of the town of Washington to take a trip with them in the country and out to the fair grounds. We had promised to be ready by four o'clock, but we will say to Mr. Zinn that he may continue his address until fifteen minutes after four; that will allow three-quarters of an hour. Now I would like to know how many in this audience will be ready to take that trip at fifteen minutes after four? The cars will stand just in front of the court house. Those who will go, please hold up their hands. (Those present held up their hands.) Well, that's about two carloads.

The CHAIRMAN: Members of the Institute, I feel that you are not weary, and I take pleasure in introducing to you Mr. W. D. Zinn, of Phillippi, W. Va., who will deliver an address on "Factors Controlling Soil Fertility."

Mr. Zinn's address is as follows:

## FACTORS CONTROLLING SOIL FERTILITY

By W. D. ZINN, *Phillippi, W. Va.*

I confess that when I received the invitation from Director Martin to come down and address you, I felt myself highly complimented. The truth is, my friends, that I have been sitting at your feet for thirty years learning agriculture, and I feel that it is a case of the student instructing the teacher when I come here to discuss this subject before you.

The quesion of soil fertility, like the story of the Cross, is a very old one, and like it, the more we study it, the more interested we become in it. If you will pardon me my friends, for a personal reference, I would like to tell you how I became interested in soil fertility. About thirty years ago I had become the sole heir of a large farm of twenty-one acres of the poorest land that ever laid out of doors, I think. Realizing, as a good many farmers do, that I could do nothing on twenty-one acres of land, I bought some more just like what I already had inherited, and kept on buying until I had nearly one hundred acres of land and a mortgage of $4,000. The mortgage gave me more trouble than the farm.

Now, friends, if you have ever been depressed with debt, if you have ever sat on the fence and sweat as it were great drops of blood thinking of the interest you were paying, then you know something about my feelings; and I remember one day sitting on the old rail fence and soliloquizing, and I said to myself; "Why, two can carry a load a good deal better than one; I've been carrying this load alone for several years and I know that two can carry this load easier than one;" so I went across the country twenty-five or thirty miles and I made the most liberal proposition to a young lady that any young man ever did. I said, "Here, if you will come over and go in partnership with me, I will give you a full half interest in a $4,000 mortgage. I did, friends, and I have no respect for the young man who will go away from home and get a wife without telling her or the young lady all about his financial circumstances. Now I became, as I say, interested in this, and I tell you this story because I perhaps may not be able to convince you that I understand the subject. I want you to know, friends, that I have had something to do with poor land.

The factors controlling soil fertility is the subject under discussion, and the first one to which I want to call your attention is that of drainage. Notwithstanding all that has been spoken or written about soil fertility, the fact remains that our lands are becoming less and less productive, but the population is increasing at a rapid rate and all the people must be fed from the soil. Farmers are depending largely upon the purchase of commercial plant food to maintain the fertility of the land, and in many cases, the last state of the soil is worse than the first. But few farmers, comparatively speaking, have understood the fundamentals of soil improvement. The essentials of fertility that I shall discuss in this paper are drainage, lime, organic matter, tillage, manures, and commercial fertilizers.

There are thousands of acres of unproductive soil soil because drainage is needed. We never thought, my friends, that upland or rolling land often needed drainage, and yet it is true that some of the worst water logged soils I have seen within the last few weeks in traveling over farms, was on the upland, and lands the character of whose subsoil was such that the water could not get down through it; you might say it would run off of it; yes, but we want it to run through it. My friends, a water-logged soil is not benefited much, or a soil is not benefited much by the water running down over it.

There are three essentials of plant growth, viz, heat, air and moisture, none of these are found in proper proportions and in right conditions, in a water-logged soil. Not only are level lands in need of drainage but many of our rolling lands. Because water runs off the land is no reason why it is properly drained. The water should run through the soil. Erosion is one of the means of depleting a soil. If the land is underdrained, this erosion is not half so serious. When water runs down through a soil the plant food is strained out, so to speak and left where plants may get it.

*How to Drain:* Any method of drainage that will carry the water off the land is to be preferred to no drainage; but that system of drainage that will not only carry the water off but will aid in soil secretion most, is the best method. Underdrainage, therefore, is always to be preferred to open ditches. How deep should the ditches be cut, how far apart and what size of tiling should be used, are questions that farmers often ask. There are two things that should determine the depth of the ditch,—the outlet and the character of the soil. Of course, the outlet should be lower than the ditch, and if the soil at a depth of 2 1-2 feet is an impervious clay, then the ditch should not be cut more than one half the diameter of the tile into this clay. The reason for this is that there is danger of the tile being sealed up in this clay so that water will not get into the tile freely. The distance of the tile apart depends upon the depth of the ditch as well as upon the character of the soil. A ditch three feet deep will drain back about 25 feet, but if the soil should be an impervious clay then the ditches should be closer, for the reason that the water will be too long in getting off the surface. The size of the tile depends upon the volume of water to be carried off. Ordinarily if the mains are laid with 6-inch tiling the latterals should be 3 and 4 inches. I would not recommend the use of tiling smaller than 3 inches. Again, if the fall is great the tiling may be smaller than where there is less fall for the water will get out sooner.

*Lime:* After the land has been drained the next step to be taken is to apply lime if it is needed; and on most of our soils the need of lime is very apparent. The older our lands become the greater will be the need of lime, for it is one of the elements of plant food that is all the time leaching out of the soil, and I might add, in this connection, that the more we leave our lands bare the greater will be that leaching.

*How to know that the land needs lime:* The presence of weeds where domestic plants should be growing is an indication. The failure of clover to row is a beter indication and the reaction of the acids upon blue litmus paper is one of the most accurate when the test is properly made. Having determined that the land needs lime, the next step is to apply it in the right form and proportion. The old adage that, "Lime makes the father rich and the son poor," grew out of the excessive use of lime. Lime is a stimulant, and over stimulating always results in weakening the stimulated. Years ago little lime was used, except in the burnt form, but of late years we are told that the form matters but little only as it effects the price. Ground limestone, if ground fine enough, is just as effective as any other form, and when it can be purchased for half that the quicklime costs, it is to be recommended. The amount to be applied depends upon the acidity of the soil; but an application of from 1,000 to 2000 of the quicklime and twice that amount of ground limestone is sufficient in most soils except where alfalfa is grown, and then more should be applied. When possible, this lime should be put on plowed ground. It may be applied to sods with great benefit, but under no circumstances should it be turned down immediately after being spread. It is better to apply small quantity often, than large quantities at longer intervals, for the reason that less loss will be sustained by leaching.

By organic matter in the soil, we mean anything that has had life in the past, whether that is animal or plant, and has died and gone into the soil. If you will take samples of soil from the primitive forest and from the depleted soil to the chemist he will find by analysis that there is little difference between the plant food content, but he will inform you that the new soil contains from 12 to 14 per cent. of organic matter while the old soil has from 2 to 4 per cent. only, herein lies the difference in production. Naturally the plant food in the soil is unavailable to plants but the decay of vegetable matter in the soil forms certain acids which act in the same way upon the raw plant food that sulphuric acid acts upon the phosphate rocks of the South—makes the plant food available.

Our lands, therefore, are largely productive in proportion to the amount of organic matter they contain. If organic matter is so important in the soil, then our rotations should always be planned with the view of replenishing the soil with all that we exhaust in cultivation of the same. One of the most practical ways of doing this, is by following a short rotation in which cover crops and heavy sods are turned down. If the farm manures and commercial fertilizers are used on the soil, improvement of crops, and by these I mean crops, that will add organic matter to the soil, the organic content may often be increased and still good crops grown and part of them removed. The application of 100 nitrate of soda per acre on a timothy sod will, not only give the farmer more hay, but it will give him a much thicker and better sod to turn down, and he will add more organic matter to the soil by so doing. No rotation is perfect that does not include one legume at least; two are better, if it can be arranged. One common mistake, andone that has contributed as much toward soil depletion as anything else, is the method of leaving fields bare through the winter. Not only is plant food lost, both by erosion and leaching, but the opportunity is lost of adding organic matter to the soil at very little expense. The slogan of every farmer should be, "Get more organic matter in the soil."

*Tillage:* In former years we tilled the land to keep down the weeds. That is still one subject of tillage; but it is the most remote one. The objects of tillage named in the order of their importance, are as follows: (1) To conserve moisture; (2) To make available plant food; (3) To aereate the soil and (4) To kill weeds. No matter how much plant food we have in the soil, if there is no moisture, the plants cannot use it. By a proper system of tillage, we form a dust mulch on the soil which, like a blanket, prevents moisture from escaping. The careful farmer sees to it that this dust mulch is preserved in his field and after a rain which has formed a crust on the top, he goes into the field to break the crust and reinstate the mulch.

*Making Available Plant Food:* As has already been stated, the plant food in the soil is unavailable to plant in its natural state. Thorough tillage breaks down the particles of soil and makes plant food easily soluble for the plant. In this sense, it may be said that tillage is manure.

*Soil Aereation:* Plants must have air if they are to live. A part of this air must be taken in by the roots. Air cannot enter an impervious soil, hence the soil should be stirred frequently to let the air in. During the hot days in the growing season the soil is heated, and hence the air in it also. At night the air above the surface cools off and, being heavier than warm air, falls to the ground and crowds out the warm air. In this way the air is changing every twenty-four hours and the soil is being aerated.

*Killing Weeds:* A weed is a plant out of place and, as such, they are trespassers and should be destroyed. The best time to kill a weed is when it is just opening into life. Constant tillage catches these trespassers before they are deep rooted and hence they are, by this method, easily destroyed. If we properly till the soil to conserve moisture, make available plant food and aerate the soil, we will have but few weeds to destroy.

*Manures:* I have thus far discussed some of the means by which the plant food of the soil may be made available. I now want to call your attention to the matter of supplementing the natural strength of the soil. Whenever I find a livestock country, I invariably find a more fertile soil than where little or no livestock are kept. This is due to the influence of the manure upon the soil, but in no country do I find this influence half so potent as it might or should be.

To fully and justly appreciate the farm manure, is a lesson that many farmers have yet to learn. One needs to travel but a short distance by rail or otherwise through an agricultural section to observe a woeful waste of farm manure. It is not as bare as it was ten years ago, but it is yet intolerable. The manure from a well-fed horse is worth at least $26.00 per year and that of the cow more than $20. One fact in regard to the value of manure that has been overlooked by many is, that the liquid manure contains 65 per cent. of the plant food of the excrement of the animal, and yet comparatively few manure farmers make any attempt towards saving the liquid. The Ohio Experiment Station proved that a cement floor in a barn would more than pay for itself in two years. Another source of great loss in manure is that of the ammonia. When manure heats, a great deal of the ammonia passes off. To prevent heating, keep the manure well tramped, or mix the cattle manure with the horse manure.

When, where, and how should manure be applied are questions that many farmers ask. There is no longer any doubt but that manure should be applied as soon as made. There is always a loss when manure is held. Manure cannot be applied to any crop without giving good results, but what the present farmer wants, is the best possible results. The reason why manure gives better results than commercial fertilizers is, that it contains organic matter and, as has been previously stated, organic matter is what the soil most needs. If manure, therefore, can be used to grow organic matter for the soil, the results will be still better. By using the manure on the sods, a better sod will be had to turn down. This, in my judgment, is the best place to apply manure. It may be used on any other crop that is to be turned into the soil, such as rye, crimson clover, etc.

The mistake has been made in the past in applying large quantities of manure. If eight tons of manure are available and we have two acres needing it, better results will be obtained by top dressing the two acres rather than by putting it on one acre. Manure is rich in nitrogen and potash and poor in phosphoric acid. It will pay, therefore, to reinforce all the manure with this element since plants, like animals, require a balanced ration. If forty pounds of acid phosphate are added to every ton of manure, it will be worth to the land one dollar more after paying for the treatment. This is the finding of the Ohio Experiment Station.

*Commercial Fertilizer:* After every means of making plant food available in the soil has been employed, then, and not until then, is the farmer justifiable in purchasing commercial fertilizers. The farmers of the United States spend annually more than three hundred million dollars for commercial plant food, and it is safe to say, that by the injudicious use of the same, more than half this money is lost. Farmers buy the same kind of fertilizers for all kinds of soil. Take our heavy clay soils and there is in the surface foot on an acre, thirty thousand pounds of potash and the second foot contains nearly or quite as much. It, therefore, stands to reason that a heavy clay soil does not need potash. "But," says one, "I have used it on such a soil and gotten good results." Then it was on account of the potash in the soil not being available. The means for making available plant food had not been employed.

Another source of loss in the purchase of commercial fertilizer is the low grade purchased. Thousands of tons of fertilizers are sold that do not contain more than eight or nine pounds of plant food. The freight and bagging of this low grade costs just as much as in a goods containing twice the amount of plant food. Fully one-fifth of the cost of fertilizers could be saved if farmers would purchase the chemicals and do their own mixing. Recently a dealer showed me a fertilizer containing 8 per cent. phosphoric acid and 5 per cent. potash which he sold for $23.00 per ton; but he also sold acid phosphate and nitrate of potash, and at his price on these goods, I could have bought them and made a fertilizer containing the same analysis for $13.50. If farmers will use plenty of lime, it seems that they have but little use longer to purchase nitrogen, for they can grow it so much cheaper.

Then with a clay soil well filled with organic matter, there is little need to purchase anything but phosphoric acid and there will never come a time when we will not need to purchase this element. Why should we give attention to all of these details? First, because it will increase our profits on the farm; second, because if our farms are productive we get more pleasure out of our business; and, third, because we owe it to the future generations to leave our farms in a better condition than when we took charge of them.

We are leaving the land bare. We must necessarily, unless you sow some cover crop to grow in the fall ,you must necessarily leave the land bare through the winter, and I would rather have a crop of wheat growing on my land than have the soil bare from the time the corn is taken off until the oats are sown in the spring. But something should be put there, if it is nothing but rape or a little bit of rye, something to grow there to catch the leaching plant food and vegetable matter and keep it in the soil.

The CHAIRMAN: What is the best thing we could plant under the circumstances?

MR. ZINN: If you can grow it, crimson clover or hairy vetch are two of the very best things, because, while you are adding organic matter to the soil, you are also taking out of the air some nitrogen that costs us so much when we buy it. A Virginia farmer told me about owning a hundred acres of land, poor land, and he owed a thousand dollars and the tears almost came in his eyes while he was telling me about it. I said, "Mr. Jones, I don't think you are as poor as you imagine you are. On every acre of this land, for the depth of one foot, you have at least thirty thousand pounds of potash." It was a heavy clay soil in the Piedmont section. "You have some twenty to thirty thousand pounds of potash; you have about three thousand pounds of phosphoric acid, and resting down on every acre of your land, you have about ten million dollars worth of nitrogen and yet you have been buying that very element for years and years." And that's true of your farms here and it seems to me that we ought to utilize some of this ten million dollars worth of nitrogen, and we can only do it be growing leguminous crops, crimson clover and hairy vetch. Sow a little hairy vetch, and next year try it again.

A Member: How much seed to the acre?

MR. ZINN: If you are sowing that alone, half a bushel to the acre, but I would not sow it along, sow it with rye. Only this week at Bethany College, West Virginia I saw them turning down hairy vetch this high with rye.

A Member: How much rye to the acre?

MR. ZINN: I sow two bushels of rye to the acre. My seeding is this; we sow half a bushel of rye, a gallon of rapp seed—not a gallon. but two or three pounds of rapp seed, and a gallon of hairy vetch and about a gallon of crimson clover. I will give it again; half a bushel of rye, a gallon of hairy vetch and crimson clover and two or three pounds of rapp seed to the acre, and I often say— and never say it but what I think of Mr. Seeds—some cowhorn turnips if you can get them.

A Member: Do you think that the land laying bare in the northern part of the State is as bare as in your state?

MR. ZINN: Not quite so bad, but you are losing some all the time, not only by leaching and erosion, but you are losing the golden opportunity of getting vegetable matter in the soil, and if you don't grow more than six inches of this and turn it down, you are getting several times the cost of the seed. The Delaware Experiment Station sowed crimson clover the 2nd of July and I have tested it the 2nd of November and found it had gathered $8.35 worth of nitrogen, not all from the air, but it is very fair to presume that they got half from the air, and that would mean that more than $4. worth of nitrogen came from the air, besides the organic matter that is added to the soil.

A Member: Tell us when to sow that mixture of seeds?

MR. ZINN: Sow it at the last working of the corn. If I am growing rye alone, if I could get the corn off early enough, I'd rather sow the rye after the corn has been removed, because I have had some disappointments in sowing rye in corn. Sometimes, if it is very dry weather, you won't get much rye, but if you mix the rapp and cowhorn turnips, and hairy vetch and crimson clover, you will have one or the other.

**MR. J. ALDUS HERR:** We, in Lancaster county, have always had a failure about the first of July. If we sow it as soon as we can get our corn away, nine times out of ten we have a success. Crimson clover has been a failure with us three to one, and vetch—we tried it three years and failed.

**MR. ZINN:** My recommendation is to sow a little vetch and thereby get the soil inoculated. I failed signally when I attempted to grow a crop by sowing it alone. The crimson clover is very much like the hairy vetch; it requires soil inoculation also.

Now I am glad to be interrupted. I will quit when the time is up, whether I get through with the subject or not. There's a whole lot of things I'd like to say about organic matter in the soil. I must say this; I believe we make a serious mistake when we sow that ground down to grass. We mow it just as long as it will pay to mow, and then, because it does not pay to mow any longer, we plow it. If we keep that up, we will never improve our soil because we are not adding organic matter to the soil by that rotation. When you plow down sod from which you have cut three or four tons of hay, you are adding to the soil almost three or four tons of organic matter, not quite as much in roots and stubble, but if you allow that to run out until you don't cut but half a ton of hay, then you are adding only half a ton of organic matter, and it is organic matter—if I don't say anything else—it is organic matter that our lands need worse than anything else, worse than commercial fertilizers.

**A Member:** If you let that go and get into blue grass and let that lay, will that still add?

**MR. ZINN:** It won't add as much as if you have a good heavy sod. In order to do that, if I meant to allow that to grow up in blue grass, I would use manures and commercial fertilizers on blue grass sod, so that when I did plow, I would have a good sod to turn down. I believe you will get better results from the fertilizers and the manure than if applied in any other way. I never would have gotten started if I had not had to depend on commercial fertilizers to some extent.

**A Member:** Mr. Zinn, I am not a farmer, but I have a garden. I sowed it in clover this year; what will I do with that this fall?

**MR. ZINN:** You don't want to plow it this fall?

**A Member:** No, sir, I just want to know what to do with it.

**MR. ZINN:** Fertilize it, have it grow as much as possible and turn it down in the Spring. Now, friends, this has been a very rambling talk. I feel like you have been so patient and have listened to so many good speeches, that I will not trespass further on your time. I have only touched the high places in this talk. I thank you for the attention you have given me.

(Adjourned to 7.30 P. M.)

Wednesday, May 21, 1913, 7.30 P. M.

Mr. S. C. George, West Lebanon, Chairman.

The CHAIRMAN: The Institute will please come to order. Owing to a little misunderstanding between the Department and Dr. Holmes, Dr. Holmes failed to get here yesterday evening, as you all know, and is here this evening. His subject will be taken up first, and then we will proceed with the regular program of the evening. I now have the pleasure of introducing Dr. Holmes, who will speak to you on the "Country Boy."

Dr. Holmes addressed the Institute as follows:

## THE COUNTRY BOY

By DR. A. HOLMES, *State College, Pa.*

Ladies and Gentlemen of the Institute: I am sure it gives me a great deal of pleasure to stand here to-night and be permitted to occupy a place on the platform. I am sure that what I have to say will be somewhat discounted on account of the fact that you are a disappointed audience; I feel that as well as you feel it.

I want to talk to you to-night about what I think, of course is the most important product of the farm, in fact the greatest asset of the country. While I myself happen to be a father and not farmer,at the same time I believe that I have had something to do with raising a crop in this country, that, after all counts for more than any vegetable or any other kind of crop or animal, and that is the country boy, so that while I am a specialist and in a sense, a psychologist, I want to talk to you about a perfectly clean cut, concrete topic. I want you to understand what I say to-night. It is always difficult, of course, when a specialist, especially a psychologist, talks, because somebody has said that talking on psychology is discussing a subject about which everybody knows in terms which nobody understands. My first endeavor then, will be to make you folks understand, because I don't want you to be like a man down in Philadelphia who swallowed a dollar and has been guessing ever since whether he is a dollar in or dollar out. I understand, in the first place, that I am talking to plain people without and preternatural convolutions. You needn't bother about that, it doesn't mean anything in particular; I said it to break this machine that is going in front of me.

But I want to make clear to you in the first place such a simple thing as what a country boy is. Did it ever occur to you that, as a matter of fact, we so far haven't got a definition of a boy or of a child. The only science that understand to define a child is the legal science, which calls everybody an infant under twenty-one, so that an individual, a boy is an infant until he is twenty-one. He may be twenty years of age, eleven months and 29 days, but he is an infant, and then when he has passed over the next day he is a full grown man, so we don't have any clear definition of what a boy is. I want to talk to you a little while about how the mother looks at the boy, how the father looks at the boy and then how the new science of child study looks at the boy and especially the country boy.

I think the mother looks at him as a little angel. I saw a series of pictures of the boy as he appeared from different viewpoints. As the cook saw him, he was large and round and fat as a great big porker, ready to eat anything and everything. As the cat saw Johnnie, his hands were as big as hams when they were after the cat. As his mother saw him, Johnnie was a little angel with halo above his head, and Johnnie, as the neighbors saw him, had a spiked tail, claws on his hands, cloven hoofs and horns beginning to appear on his head. And so I say that boys vary with the viewpoint. From her viewpoint, the mother looks upon him as a little angel and I doubt whether anybody else in the world does.

If I had time, I might arrive at the point where I might say to the mothers of the land, "There must come a time when your boy, whom you love with all your heart and soul, will reach a period in his life when you will have to let go of him more or less. He will come to the age of 12, 13 or 14 when he is going to step out and be a man." I have heard of a mother found in tears by a neighbor, and when she was asked, "What is the matter, Mrs. Jones?" she answered, "Oh! I have lost my baby." The neighbor knew there was only one boy in the family, and asked, "What's the matter, what in the world has happened?" "Why, this morning, my boy, six years of age, started off to school." There was the mother broken hearted, weeping over the fact that her baby was gone.

Well, there is a greater tragedy to come in the life of every wise mother, and that is the time when the boy has reached the age of 14 and for the first time in his life steps out into a man's estate, for a woman cannot follow him there because the ways of men are and absolutely must be unknown to a large extent to women. You know we men have always confessed our ignorance concerning the fair sex, but on the other hand it is just as true that you never, in this world, can follow a hearty boy into a man's estate. The father is very likely to make a mistake about a boy. I think in America most of our fathers neglect their boys. One of the difficulties we have in this problem of social uplift is the fact that the fathers of American boys are so busy earning dollars and cents that they haven't time to take care of their boys. Now I don't believe that the mother can take care of a boy altogether even from the time the boy is one year old up to twelve; I know she cannot take care of him altogether after he is twelve; and I don't believe there is any tragedy in this country so great as for a man to put all of his energy into his business—it may be a farm, he may start out as a young man with great ambition and determine that he is going to add acre to acre, that he is going to have the finest stock, that he is going to have the finest orchard in the country, that he is going to be known for his cultivation of his fields, and then after while find out that the greatest asset of his farm has been absolutely neglected.

Business men, I know, are doing that all the time. You hear of tragedy like that every day. I heard not long ago of a man who was as busy as he could be trying to get enough money to give his boy some clothes and something to eat and a roof over his head, and when the boy grew to be 14 or 15, the father found out that the boy was slipping down and down. His mother could not hold him, his father had lost his grip and that man knew that if he stopped his business for a month or two months or three months, it would cost him thousand of dollars; but he made up his mind that the only thing he could do was to stop, so he stopped and he and the boy went off for a vacation of three months on a lake and there the father went back to his own boyhood and they hunted, fished, swam and camped together, sat around the fireside and talked together, and at the end of three months that boy was back to his father's heart and that father had spent three months in cultivating the most magnificent product there is in this country. You look upon your boys more or less as assets and try to think of them in terms of dollars and cents. We are that way in this country; I am sorry we are, but nevertheless we are, and I want to say to you, just a word or two, about the value of some of our boys in this country.

Do you know that there are about 250,000 babies born in the United States every year, and do you farmers know and do you stock raisers know, you who are so careful about your efficiency in raising your stock and bringing them to pasture, that by the time the children who are born this year will be 23 years old, 50 per cent. of them will be dead and buried under ground? Half the crop of babies every year is a total loss before the time they are 23 years of age. By the time that money, and time and energy have been put into their cultivation and their education, they are gone—half of them gone. Out of all those that are born, there are only about five hundred and fifty thousand male workers left; out of the crop this year there will be only about five hundred and fifty thousand men workers ready to go into the world and earn their living when they are twenty-three years old. Out of that number about half, we will say two hundred thousand boys, are in the country, for it is still true that about 50 per cent. of our people are country people; so we have a crop of about two hundred thousand boys growing up every year.

What are two hundred thousand boys worth? Those two hundred thousand boys are worth about $8,000,000 a year, that is they add about $8,000,000 worth of wealth every year to this country. You immediately want to deduct the board, etc., the cost of that worker, but you don't do that when you raise stock. When you raise stock, you simply count the gross result. These two hundred thousand boys will add one billion six hundred thousand dollars every year to the total wealth of this country and if they are carried over thirty years, these boys will be in round numbers worth about fifty billion dollars. The yearly crop of boys, country boys, in this country, reduced to dollars and cents, is worth about fifty million dollars. I wish I had time to show you this fact, that if you farmers will take the best asset you have on your ground and send that boy out and give him a first class education, that instead of making about $588 a year for his income, for his own personal income, not the wealth produced by his hands which somebody else gets a part of, but for himself, he will make about $588; whereas, if you give him an education, he will go out and make about 1,188 a year, every year. That boy will be worth about $600 a year more to himself with an education than without it.

Now I put this thing down on the American basis, a pretty low basis. On the other hand, I would like to say to any man, that the biggest assets you have for your own education in your home is your own boy, and when you can sit at the feet of your boy and learn something from him every day, then you will really find out the value of the boy; for in the first place, the thing you will learn is the enlargement of your heart, the chance to pour out yourself to somebody you love, it doesn't make any difference whether you ever get any return in dollars and cents or not. You men have boys, and rating those boys and telling those boys daily that you expect them some day to pay you back the money you are putting into them—when you do that you are laying for yourself in the future the foundation of almost illimitable sorrow. Some of these days those boys will profit by the teaching you are giving them. Do you know that if you talk to your boys along this proposition, "My son, when you were a baby I cared for you, when you were a boy and couldn't work, I clothed you, when you were a young man I sent you to school and all of these years I have given you a house, given you something to eat, put food into your mouth and clothes on your back and when you get ready to work in this world, father expects you to support him;" I want to say to you, beware, your boy will grow up with that kind of an education and put it into practice and the day will come when he will give you a living and that's all on this earth he will give you.

Did you ever hear that story that George Ade tells about the young man that was brought up right by an American father said he didn't believe in such tom-foolery as Christmas time, didn't believe in wasting his money on such sentimentality as presents and every year when Christmas time came around the father took ten dollars and put it in the bank and the boy and he sat down together and figured out what the compound interest would be and enjoyed their Christmas in that way and didn't waste any time eating or drinking, and the same thing was true when the Fourth of July came around, and finally the boy grew to be twenty-one and the father had taken him into business with him and the boy had put out the money he had at compound interest and went into partnership with his father and it took only three years for him to crowd the old man out of the business and possess it all himself, every bit. Then the old man protested and said, "Son, how could you be such an ungrateful son as you are?" The boy said, "Ungrateful, don't talk to me about gratitude; this world is made up of dollars and cents, and whatever the cash register says, that's all the tale there is to tell."

And the moral of it was that if you bring up a tree, the way the sapling is bent the tree will be inclined, and that is just as true as anything on this earth can be; and I want to say to you fathers tonight, I believe that one of our great difficulties in this country is that the father is so busy making enough money to buy bread to eat, getting a house, getting the boy clothed, that he forgets that the finest and best education on earth that a boy can possibly have is to learn by sympathy the gratitude and love and kindness and tenderness and mercy that are thrown out that are thrown out into this world without any idea of their ever coming back in dollars and cents and are the finest things in life; so I want to say tonight to fathers who do love their boys, and of course you love your boy, but for Heaven's sake don't get so busy with the cows and horses and pigs that you forget you've got boys. Why is it you fathers must live way over there by yourself? What do you live way out there for? "Because I've got to be near my horses and my cows and my pigs and so on." Don't you think anything about the children that are growing up in your home? Do they want to live there? Do they want companionship? Do they want opportunities for education? Why in the world don't you run your farm out there and buy an automobile and ride into town and live in a suburban town at night, stay there all night like a civilized man with your family and next morning get into your automobile and go out there next morning and go out there to your farm? "Heavens and earth, you'll wreck the country." Let her be wrecked. I'd just as leave let this country be wrecked as to be constantly bringing up boys that are going into our institutions, our insane asylums, our penitentiaries, our feeble minded institutions and places of that kind. I just want to throw that out to you fathers. I am so deadly radical, so idealistic, that I don't believe it is at all necessary for a farmer to live way out in the woods on account of his cats and dogs and horses and swine. A farmer ought to make up his mind just as a business man does to have some place he calls home, and then go to his work.

Well, I guess I'll have to talk about the country boy as he really is. I think maybe I'd better get close home to my subject and stay there, because if I get on the subject of a farmer's home, a subject that I love with all my heart, soul, might and mind, if I get on the subject of fathers and mothers, I will stray far away from the subject I am really on, and when I have strayed for away, I always come back and feel sorry about it at the end of the speech. I am like the man that got married. When the ceremony was over, he was about to throw his arms around the neck of his bride, when she said, "Hold on." "What's the matter, Maria?" "I made up my mind that I am not going to be like other women; I am going to have an income of my own; I'm not going to come to you every time I want a quarter and ask you for a quarter, so every time you kiss me, you've got to give me a dollar." So the young fellow didn't know what in the world to think, but he was very much in love and very foolish and so he agreed and the lady, the first year, had a good income. The next year, and the next, it fell off a little bit, but they got along nicely and he went into business and one day he came home and said, "Maria we are ruined, I've lost everything in the world; the house is gone, the furniture is gone, the carriage must be sold and everything." She said, "John don't be so discouraged;" and they rode around the town and finally they came to a house sitting back on a lawn and she said, "How would you like to live there?" Don't torture me," he said, "you know we can't go there." "Yes we can." "How is that?" That is my house." "Where did you get the money to buy that house?" "You remember that every time you kissed me you gave me a dollar; I put that money out at interest and that is my house; I bought it with the proceeds." And John's head went down, he looked at the floor. She said, "John, what's the matter, you don't sem to be very happy about this." "No, I was just thinking of what a fool I'd been for not having done more of my kissing at home." If I wander from my subject, I always feel like that man, I wish to goodness that I had done most of my kissing at home.

So I'm going to tell you what I really think a boy is from the philogenetic or genetic point of view. There is just as much difference between a boy and a man as between one kind of a dog and a wolf and there is as much difference between a boy who is sick and a boy who is well as there is between a bull dog and a shepherd dog. There isn't a man who can take hold of a shepherd pup and make him into a rabbit hound. You can break him in and make a sort of an imitation out of him, but he will be a mighty sorry sort of a dog. There are certain primitive instincts that must work themselves out and unless they get an opportunity to do that, if they are thwarted, the result is a no-account beast. I saw a little dog of that kind one time; it was in a cow patch. The cows did not belong to the master of the dog, a shepherd dog, and every time he began to follow his instinct and run after the cows, they had hauled him up and tied him to a post and after a while he was a splendindly broken, well trained dog, wouldn't look at a cow, and I remember that dog when it grew up, wouldn't come around the house, wasn't any good at night as a watch dog and you'd find him lying out in a plowed field all by himself. He wouldn't come when you'd call him and I wondered what he was doing at night, because he slept all day and wasn't around the house at night; and after a while I noticed that his nose and paws were all muddy and one day my brother and I saw the tracks of this dog, the only one of the kind in the country, such a perverted brute, so well trained that he wouldn't look at a cow and lay around in the day doing nothing, and at night that dog prowled all night long up and down the creek routing out musk rats. We have taken our boys that have a nature, and instinct that belongs to them and tried to turn it and shape it to make it suit us.

I want to leave this thought with you tonight; if you've got a boy at home on your farm, for Heaven's sake don't try to save him from the foolishness you went through yourselves. He's got to go through it. Let me tell you people tonight, you are no better than the young people, not a bit. If you could go back for a minute and your bodies could be made young again, you would be as foolish as they. You'd go out and dance all night till three in the morning. But there's something gone out of your system, your psychology, your mentality. You think anybody that does that is foolish. You want to take the young fellow today and make him a different young man. It is absolutely impossible. You were the foolish fellow you were at 16, 17, 18 because your father was, and your father was what he was because his father and grandfather was. That is the first proposition I want to lay down.

You may change this country, you may climb up the sides of our mountain and sweep them clear of their timber and the rains will descend and the floods come and move the mightiest works made by the hand of man or God, you may blast away the mountains, dig tunnels through them, harness the mightiest rivers and if you please, the tides of the very ocean, but believe me you cannot change the nature of a boy; he is going to have his way in this world as sure as you are born, and if you try to thwart it you will fill these institutions like the one across the street. I saw over there tonight three or four little children playing in the street on the cobble stones, while two puppy dogs, following their nature, were engaged in a perfectly riotous play on the green grass. Why, those boys would have been taken up and put in that penitentiary over there if they got on the grass; dogs on the grass were all right; but you keep the boys off the grass. That's what we are doing all over this country, everyone of use, especially in the cities.

I haven't so much to say against the country. A boy naturally finds in the country the environment he wants. He finds there the kind of environment that fits his nature. The country fits the boy to perfection. The trouble with the country is, father and mother, because they don't understand that when Johnny wants to go fishing he is doing something that will educate him more than anything else. Let me, for an instant, go through some of the stages through which your boy is likely to go, for this is what your boy is, mother; you know that nice little angelic baby of yours, that little baby is a savage, he is going to be a savage and going to be a barbarian, he is going into the nomadic period, then into the agricultural stage, and then he will develop into the chivalrous stage, and then into a 20th century man. Roughly stating, that is true. I am not going to insist that that is absolutely true. Your boy is going to begin as a savage, then going into the barbarian period, then going into the nomadic period, then into the agricultural stage.

Way over there in Brooklyn, New York they took me and showed me with a great deal of pride a little plot of ground, about this big, where they were letting the children born over in New York and whose parents perhaps have been in the country for centuries, letting those children express, as far as the poverty stricken city can, the primitive agricultural instinct in the children. Why, there is a period in life when everybody who is normal would be a farmer. I could take every boy in this country, except a certain small percentage, and make a farmer out of him and he'd like it better than anything else in the world. Our schools haven't found it out. They are trying, in advanced schools, to come somewhere near it, so they give little children these little gardens, taking hold of this primitive agricultural instinct.

When you have a boy to begin with, remember you've got a savage. Don't think because you are a Christian man and a Christian woman because you have a Greek education, because you have gone through cultural periods, that therefore your boy is going to be born up here where you left off. Nothing of the sort; he is going to be a little savage, and the thing you've got to do is to let him work his savagery out in play. In 1780 Dr. Rush of Philadelphia said that the Moravians give their children all of the necessary manual exercises in the simple form of manual art. I went there the other day and they have a magnificent brick gymnasium, and there they are letting their boys and girls play. Why? Because they have found out that play is absolutely the best education on earth for the growing boy. If you stop that boy from playing, it's sure as can be you are hurting him all his life. He must play, he is bound to play, and when he begins to play, his little instincts crop out. He wants a bow and arrow, he wants to hunt and shoot and chase, he wants to play hide-and-seek, because our ancestors made their living by hunting and chasing and being chased and the same sort of instinct is going to crop out in our boys.

Notice in the first place what a magnificent environment the country is. Every once in a while I hear people in the city bemoaning the fact that so many of our children have got to grow up in the country. They think that because anybody grows up in the country, he hasn't got a chance; but you go right down in the city and look at those poor children. The other day I rode out on the East Side of New York in the railroad train and saw those poor children out there playing, watching with one eye the policeman and watching with the other for somebody to chase them, and snatching in that way little bits of the play that their life desires. It is only natural for boys to want to throw and play ball. Why? Because, way back in their own ancestry, when our folks were hunters, the man who could throw and throw straight and throw quick brought home a dinner to the family and his offspring succeeded, they survived because they were the fittest or had the fittest father, and as a result the boys whose fathers were strong, straight throwers and quick throwers have survived. A boy throws, you know, instinctively; a girl can't throw, she has to learn, and a woman never has learned to throw. Why? Because their mothers didn't have to throw, but their fathers did and the reason you and I are here tonight is because we had fathers who were first class throwers. They threw with a club, they threw with a sling and threw with a stone, and the right arm of your boy has something in it that makes him want to throw.

Suppose you have got a boy walking along the road with gravel on the side of it and suppose right over here there is an impudent pane of glass staring out of an empty house, what is he going to do? There's a policeman on the corner, but it doesn't make any difference, he is going to throw. If he is out in the country, he can throw. A boy can throw in the country and nobody bothers their head about it, they praise him for it and quite rightfully. Suppose he is in the city where no boy has any business to be; when he is a city lad, he hasn't a chance to work that off unless he can do it in a back alley, unless he gets out and snatches up little pieces of clay in the alleys or gets on a city play ground that is already crowded. Over in New York City, Miss Farrell, who teaches children, had a boy that would throw. She got him up one day and said, "I understand you threw and broke a pane of glass?" Then she sent the janitor and had him set a pane of glass up in a chair and said, "Johnny, here's the ball; let's see you break that pane of glass." He was so astonished that at first he didn't know what to make of it, but after a while he bolted away and broke that glass into a thousand pieces. She had established a point of contact between herself and Johnny and could sit down and talk to him about destroying property. She told him that if he wanted to throw, to throw a ball on a base ball diamond and if he wanted to break glass, to pick out the beer bottles and break all the beer bottles in the world and it wouldn't make any difference if he did. When she said that, she made a point of contact with that boy and was able to get hold of his soul because he saw she was a woman who understood boys.

Now I want to take up the nomadic period. There is another stage in a boy's life when you could make every normal boy in America a cattle raiser, if you drilled him right. He would become a cattle raiser because our ancestors went through that stage when, instead of going out into the world and killing animals, we domesticated them. And so you will see a boy reach that stage where he won't like horses or cows, if he loves any kind of animal, it will be a dog. I want to tell you that if you bring up your boy without association with a dog, you neglect his education, he never will make the kind of a man he ought to be unless he has gone through association with a dog. If you can grow up with a puppy dog, so much the better, it's better than learning Greek; and I'm glad I learned Greek, but a whole lot gladder that in my lifetime I had a dog and he and I grew up together and there are lots of things I learned from that dog. I remember the one thing I learned was how to be a father: He was given to us by a farmer who didn't know anything about dogs, and that dog, being a perfectly sane normal dog, ate eggs. Eggs were good to eat and he ate them; it showed he had good sense. A puppy dog that won't eat an egg hasn't got good sense, and this dog had good sense, so when he found a hen's egg he ate it, and the farmer said, "I wouldn't have that kind of a dog on the place." I found a way to break him of eating eggs. I punched a little hole in an egg and put some cayenne pepper on the inside and after a while he saw it and ate it and then there was a circus. Now when that dog sees an egg, he will go around it in a circle and bark at it, but he has learned something. We said, "What are we going to do about this puppy dog to train it?" Finally we made up our minds to pet our dog as much as we could pet it and then, when we wanted to punish him, we would simply cease petting him, and that plan worked all right and I've got a boy at home and I do exactly the same thing with my boy. I learn more about how to bring up a boy from learning how to bring up a puppy dog than from all the studies I have ever had and all the colleges and universities I have ever attended; so that tonight I have even got to be careful about my boy because I am afraid to say anything in criticism, because he feels it.

I learned that lesson from a dog, and I say that a man who misses lessons like that has missed something fine, strong and beautiful out of his life. My own boy went through exactly that same stage. He wanted a dog and got a dog. My boy, like every other boy whose father and grandfathers were born and lived in the woods for many, many years, when we lived out in the woods, not here in America but over in the woods of Germany and Northern Europe; when we were out there and our children wandered away from the firelight at night, a wolf came along and grabbed them up, and as a result, the child that was afraid of the dark was the one that succeeded, the one that survived. Your fathers were what they were because they were children that were instinctively afraid of the dark and that same thing comes down in our children today. You think that it is because you tell ghost stories to children that they are afraid of the dark, but that is not true, it is because in our earlier history, the children who were afraid of the dark were the only ones that survived. If we went to work to club that boy into shape and punish him for being afraid of the dark, we would only make him a thwarted thing, so we let him alone and get him a puppy dog and had tied him up down in the cellar. That boy wouldn't go down in that cellar at night for a hundred thousand dollars, he wouldn't go down there for anything in the world, and for three nights the dog went down and finally my boy said, "You aint going to treat my dog that way," and he marched right down into that dark cellar and put that dog to bed, and a little while after that, when we forgot our key, he went right in through that dark cellar and opened the door for us; going down into the cellar to put his dog to bed had taken fear of the dark out of that boy's heart as nothing else could have done and had taught him one of the grandest lessons of self sacrifice he could ever learn.

When the boy came back home to the city where had to make our living, the great question was, Shall the boy bring his dog back? We explained that he could not possibly bring the dog back to the city because the city is no place to raise dogs; a city isn't the place to raise horses or sheep, it isn't the place to raise even hogs; down there in the southern part of Philadelphia, they raise hogs, but we are driving them out; the city isn't a fit place for such things as that; for such things as that you must go out into the country where there is plenty of fresh air and blue sky and good things to eat, but we crowd our cities with little children. It's a terrible thing to treat our dumb animals that way, but all right for our children; so we told our boy that we would have to leave the dog in the country, so the boy had the great question between his love for his dog and his own selfish satisfaction in having the dog with us and he made up his mind, for the sake of the dog, to leave it in the country. Do you believe there will ever come a time in all his life when there will be any finer lesson learned? I don't believe there will ever come a time when he will have to make a harder choice between selfishness and unselfishness than when he left that dog in the country for the dog's own sake.

Believe me that the country is the place for the boy from the age of one to fifteen or sixteen, and if we will only get the school conditions right, then it will be the place for him for all his life, because a boy will naturally learn more in the country. A boy learns three things in the country that he never learns in any school, that a city boy cannot possibly learn. Whenever a city boy wants anything, do you know what he says? He says first, "Where will I buy it?" Now notice a country boy; when a country boy wants something, the first thing that he says is, "Have I got it? If I haven't got it can I make something do for it? And if I haven't got something that will answer the purpose, how can I make it?" And when the country boy has learned those three lessons, he is better equipped for life than by any other thing he can ever possibly learn in this world. He has learned to solve problems that will meet every man every where he goes. Over in Brooklyn there was a school way up almost outside of the city limits, and a country girl came down there from somewhere up in New York State. She had $60 and was going to learn how to become a special class teacher. As Miss Farrell said, "How in the world are you going to support yourself?" "Oh, this will see me through my preparation and I will get a job somewhere." So Miss Farrell didn't know what to do with this woman, and when she heard they wanted a special teacher at that school in the suburbs she sent this girl over. She expected to get a telephone message protesting, but didn't get it and a month later went over to see about it, and when she got there she began to talk to the principal about other things and after a while brought up the case of Miss Smith and said, "How is Miss Smith doing?" "Fine, fine; when she came here we turned her into an empty room with nothing but a stove, and every teacher that had a boy she couldn't do anything with turned him over to Miss Smith, and she got together a few nails, some lumber and twine and other things and had those boys get some soap boxes and go out on the dumps and get tin cans and taught them how to make wooden and tin things out of these soap boxes and cans." And do you know that country school teacher with her class, with no equipment but just a few old boxes and tin cans, because she had that country notion of doing with what you have at hand, that girl took the prize in the New York City exhibition when the classes met for the exhibition of manual training, and I say to you solemnly that the country boy has the biggest chance in the world if he will only get a father and mother that understand the country boy; if you will just let him work himself out in his environment and express some of the God-given impulses that are in him.

A boy is not bad when he is born into this world, he is good; he learns to be bad after awhile, from his association with grown up people, but when he comes into this world he is good, and if father and mother can only sit at the feet of that boy and learn something from him and at the same time throw open the world to him that he finds in the country, he will fit himself to his surroundings.

Let me stop for a moment; I don't mean that you have got to move your country schools or not send a boy to school. I don't believe that any school in any city is as fine as a country school. But what I mean is, that instead of looking upon your boy, when he begins to express somethings, instinctive things in his nature, instead of looking upon those things as degenerative, remember that those things are the finest things in him and you can educate him that way better than any other way, if we only get that attitude and understand that we, as older people, are here for the good we can do our boys, we've got the viewpoint of the situation and when we'ev got the viewpoint of the situation, our good American commonsense will help us work out this thing and we will begin to understand some of the beauties of boy nature as Whittier saw him when he said:

"Blessings on thee, little man,
Barefoot boy with cheek of tan;
With thy turned up pantaloons
And thy merry whistled tunes;
With thy red lip, redder still,
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy!
I was once a barefoot boy.

"Prince thou art—the grown up man
Only is Republican.
Let the million-dollared ride!
Barefoot, trudging at his side,
Thou hast more than he can buy,
In the reach of ear and eye,
Outward sunshine, inward joy;
Blessings on thee, barefoot boy!"

The thing that I am praying for in this land of ours is, that we shall recognize that the finest product of this country, without any exception whatsoever, the standard that we ought to erect, is the good, clean, cleared eyed, tanned country boy of America, and when we put him on the apex where he belongs, then we begin to make our country suitable and fit as a blessed habitation for the country boy, you and I, fathers and mothers, will be mighty glad to live in this land. I believe there is something marvelously true in what the great Teacher said: "Except ye become as one of these little children, ye shall not enter the Kingdom of Heaven;" and I believe devoutly that when we organize our community, when we make our country to suit our boys, we will find that lo, and behold, the Kingdom of God has come and it "covers the earth as the waters cover the sea."

The CHAIRMAN: The next topic is, "Co-operation in the Distribution and Sale of Farm Products and the Purchase of Farm Supplies," by Mr. E. B. Dorsett of Mansfield, Pa., The speaker on this subject needs no introduction to a Pennsylvania audience; he is known all over the State and has often been in our meetings. I have the pleasure of presenting to you Mr. Dorsett.

Mr. Dorsett spoke as follows:

## CO-OPERATION IN THE DISTRIBUTION AND SALE OF FARM PRODUCTS AND THE PURCHASE OF FARM SUPPLIES

By E. B. DORSETT, *Mansfield, Pa.*

Mr. Chairman, Ladies and Gentlemen: This big subject which has been assigned me, in my opinion, is one of the most important that will be discussed at this Institute. That is especially true if some real good comes out of it. We have heard so much of good concerning the farmer and the farm boy during the last two days, that I begin to feel my wild oats a little. I don't know whether you understand that or not; but I want to say, in all seriousness, that I have greatly appreciated the many things that have been said here thus far along the line of organization and co-operation, and I want to leave this thought with you farmers to carry back to your homes, that whether you believe in it or not, it is coming, it is here, and we have with us tonight as we never have had before, the people, the best people of our towns and cities; and we have with us the agricultural and the daily press, and I want to say to you that, before many more meetings of this kind have been held and passed into history, you are bound to see a change in our commercial world.

Now, we are hearing much today about the high cost of living and I shall touch upon that subject tonight only because it is closely allied to the one which has been assigned me. We shall not attempt to solve the problem, however, as that is being so ably done by men at Washington who never did anything or produced anything but financial disturbances and business depression, that a solution is not necessary. It is undoubtedly true that the high cost of living might be reduced through legislation; and it is also true that it might be made so low that it would positively be too expensive to live. It is not nearly so important that the present cost of living be reduced, as it is that the poor unfortunate who has to work for a living, should be provided with ways and means of paying for the living which he gets. Or, in other words, the ability to pay is of greater importance than the opportunity to buy cheaply.

*Tariff as a Remedy:* There are many who believe that a reduction in tariff duties would reduce the cost of living, and in this they reason logically, as it is only right to expect that, if high tariff duties tend to raise the cost of living, a reduction in those duties would produce an opposite effect.

Let us analyze the question carefully from the farmer's viewpoint. We are assembled at the county seat of one of the greatest wool producing counties in our State. How much will these farmers be benefitted and how much will the cost of living be reduced to them, if they are compelled to sell their wool in an open market and buy back woolen goods in a protected one? Some time ago the duty was removed from fertilizer materials with the avowed purpose of reducing the cost of the manufactured goods to the farmer. But instead of that the farmer is paying from $2.00 to $2.50 per ton more for his goods today than he paid before the duty was removed. To cap the climax, it is now proposed, under the bill pending, to lay a duty of some 8 or 9 cents per sack that will add another $1.60 of $1.80 per ton for the farmer to pay. When hides were placed on the free list, great care was exercised to retain the duty on leather and manufactured goods so that, instead of buying his shoes cheaper, the farmer is actually paying from $1.00 to $3.00 per pair more for his shoes today than he paid before hides were admitted free.

Tariff should no longer be considered a political question, but a business problem. It is quite time that we quit making it a football for party politics, or permitting scheming politicians to use it as a means in securing office, or in retaining those already on the payroll. Let us earnestly hope that the tariff bill may be written, not by Democrats, not by Republicans, nor by Progressives, but by a Tariff Commission composed of men with non-partisan views, having high ideals, actuated only by pure motives and with an earnest desire to perform a service that shall be for the greatest good to the greatest number. The slogan of the farmer should be, "A tariff for all or a tariff for none."

*Farmers Discriminated Against:* In much of the legislation of the past the interests of the farmer and the importance of agriculture have either been overlooked or greatly underestimated, and in the proposed tariff legislation for the future, discrimination most vicious in kind and character is being thrust upon the American farmer. He is not being consulted as to his interests, and no opportunity to appear before committees and express his views has been accorded him. Many comments are being made concerning the probable effect tariff changes will have upon trade, labor and manufacturing industries in general; and in all this, agriculture, the greatest industry of them all, is seemingly forgotten. We boast of our great railroads and our manufacturing industries, of the labor and energy that is required to keep them in operation; and yet it is nothing when compared with the labor and energy required to turn the brown soil every year in order that we may grow foodstuffs to feed our people. It is true that quite recently the farmer has been discovered, and there are some who are falling over themselves in their efforts to help the farmer help himself. To me this is both humiliating and exasperating. He is not asking for, nor is he deeply interested in "Country Life Commissions," "Rural Uplift Societies," and "Social Progress Clubs." These things are of greater usefulness to the men and women who have nothing else to do but bewail the condition of the poor, down-trodden farmer. The farmer knows that, if any real relief is obtained, it must come from within and not outside his ranks. In this, and in many other states he has an organization that looks after his social, financial and educational needs, and if present indications count for anything, it will not be long before it will wield a greater influence in shaping legislation effecting his interests. He is not asking for charity; just plain, simple justice, and a fair chance and equal opportunity to earn for himself and family an honest livelihood.

I have dwelt at some length upon this question because it has a direct bearing upon one of the main factors contained in my subject, namely, the cost of distribution. It costs the farmer of Pennsylvania from three to four dollars per ton to ship his hay to the cities of New York and Philadelphia. It costs him from six to twelve cents per bushel to ship his potatoes to the same cities, while the Canadian farmer can ship, by water, his hay for $1.50 per ton and his potatoes for two or three cents per bushel. Remove the duty of these products and the farmer can readily guess the result.

*Parties Interested:* In every co-operative movement, whether it be selling the products of the farm or purchasing farm supplies, there must be at least two parties to the transaction, namely, the producer and the consumer. If these were all, it would not be necessary to write this paper or discuss this subject. Unfortunately there has been inaugurated a system of distribution, both from the farm to the consumer and from the factory to the farm, that is pernicious and expensive, to say the least. This has been made possible by the constantly increasing number of men, better known as "middlemen," who have been coming in between the farmer and the consumer, thereby decreasing the price the farmer should receive for his products and increasing the cost to the consumer. The problem we are endeavoring to solve, therefore, becomes one of method and system rather than one that can be solved by legislation.

*Remedy:* The remedy lies in a systematic and intelligent organization of farmers. Unorganized, the farmer is helpless; organized, he becomes a powerful factor in regulating trade and commerce to and from the farm, and in enacting laws governing the same.

*The Grange a Factor:* The Grange in Pennsylvania has been a potential factor in starting the co-operative movement in this State. Its plan of operation in brief is this:—A buying and selling agency has been organized, incorporated under the laws of our State, known as the Keystone Grange Exchange. The Subordinate Granges of the State join the organization, thereby according to their members the privilege of transacting business with the Exchange. The Directors of the Exchange elect a manager, who has charge of the selling of farm products and the purchase of farm supplies. Thus far the plan has been successful and is receiving loyal support from the members of the Exchange.

*Method of Distribution:* Each Subordinate Grange appoints an agent to look after the shipment of farm products and the purchase of farm supplies. The manager of the Exchange secures the market, and the local agent makes shipment as directed. By this method the farmer, with only a few tons of hay, or a few bushels of grain or vegetables, is permitted to join with his neighbor and ship in car lots, thereby saving from one to three dollars per ton in frieght as well as eliminating the unnecessary middleman. In time this method of shipping farm products will tend to standardize our goods. The consumer will soon learn that any product stamped with the Exchange label is a guarantee as to grade, count, weight and quality. This means that the farmer must learn new methods of handling his products. Much of the dishonesty that is charged against the farmer today is the result of his not knowing how to grade, pack and ship his products so that they will conform to market requirements, rather than any desire on his part to be tricky or dishonest. In order that this may be overcome, a campaign in teaching farmers modern methods of sorting, grading and packing their products for market will be inaugurated. A few competent men will be placed in the field to study this work under those who understand the business. Others will be sent to our market centers to study market needs and conditions. In a few years we will have an organization capable of handling our products at a minimum cost and at a greater source of profit.

*Warehouses Needed:* To make this system of distribution of farm products most efficient, warehouses with cold storage facilities will be needed in the cities of New York, Pittsburg and Philadelphia. This would enable us to so control the supply that the possibility of a "shortage" or a "glut" in the market would be reduced to a minimum. Arrangements should be made whereby a farmer would receive a warehouse receipt for any crop placed in storage, and that receipt should be considered good collateral by any bank, should he desire to make a loan up to the time the crop is sold. To my mind this is a better system of Farm Credits than has yet been advocated, as it obviates the necessity of placing a mortgage on his home or of having judgments entered against his real estate. It also permits him to sell at a time when the best prices prevail.

*Purchase of Farm Supplies:* In the purchase of farm supplies, we endeavor to purchase direct from the factory, or wahehouse, and have shipments made direct to the farm. At first we found this to be a difficult undertaking, as many manufacturers are controlled by the big jobbers, who, in turn, control the wholesale dealer, and he the local agent or dealer. The Exchange had no personal feeling or animosity against any of these fellows, yet it felt sure there were too many mouths being fed before anything reached the farmer. We made careful research in both the moral and the civil law, but could find nothing therein commanding this to be done. The nearest approach to it was the command, "That henceforth thou shalt earn thy bread by the sweat of thy face." But as this did not mention the other fellow, we decided to eliminate him. Today we are buying harvesting machinery, vehicles and farm implements of all kinds direct from the factory and shipping them direct to the farmer. By another year we will be shipping farm implements and machinery in mixed car lots, thereby making a saving to the farmer, both in price and freight. In like manner we are handling other farm supplies.

In conclusion, I desire to impress upon the farmers the importance of this movement. We have been promised many things and have been granted but few. In this movement the farmers must take a decisive stand. There is no just reason why we should be compelled to pay two or three times more than the first cost of an article to get it from the factory to the farm. The railroads cannot honestly be charged with the high cost of distribution. Undoubtedly their rates in many cases are excessive, but even at that only 8 per cent. of the 70 that is lost between the farmer and the consumer is received by the railroad companies. Farmers, this is our problem. Let us go back to our several homes with a firm resolve and fixed determination to battle for our rights, our homes and a permanent agriculture.

The CHAIRMAN: Next, will be an address on "Alfalfa," by Professor F. R. Stevens.

Prof. Steven's address is as follows:

## ALFALFA

By PROF. F. R. STEVENS

Mr. Chairman and Friends: This is a subject that has been taken up in perhaps nine out of every ten agricultural meetings during the past six or eight years. It is a subject upon which much has been said and written, and yet a great deal of misconception exists both as to its culture and use. One of the most valuable and oldest of forage crops, with a history beginning in the early Egyptian periods, it has followed those soils naturally adapted to its culture until it has spread in spots well over Europe and Asia. Coming to us from the Pacific Coast it followed the same course over limestone soils until its wonderful value as a forage crop urged our scientific men to devise culture by which it might be grown on a higher range of soils. In this, as in most that they undertake, they have been successful and it may now be grown on all deep and well drained soils. We have also encouraging evidence that our seed selectors and seed breeders are adapting varieties to the shallow and hard pan land. Any deep soil that is well drained to the depth of three and one-half to four feet may be depended upon to grow a profitable crop of alfalfa. The type is not material although a light sand will produce least profitable results. It should be seeded on corn or other broken ground or on a field which has been in meadow not over one year. The humus content should be high, stable manure or field peas turned under seem to give the best results.

Lime is necessary in non-limestone soils, one and one-half tons of burned lime or its equivalent, three tons of ground limestone should be used per acre spread on top after the vegetable matter is plowed under. In limestone soils this amount may be reduced but there are few soils where an application of some lime is not needed. Phosphorus seems to be needed in all soils of the State for best results with alfalfa; at least three hundred pounds of acid phosphate or its equivalent in bone or basic slag. In light soils potash is needed. The proper bacteria must be present in the soil. In non-limestone soils where alfalfa has not been grown before, artificial inoculation of the soil is essential. In limestone soils many fields need inoculation, while others seem to contain the bacteria and inoculation does not help. Unless one is absolutely sure that the bacteria exists, the field should be inoculated. This may be easily and effectively done with the cultures, provided they are intelligently and carefully used. The soil transfer method involves considerable labor, but is very reliable and cheap. Twenty pounds of seed is sufficient and in order to get best distribution, should be seeded with a wheel-barrow seeder, set at ten pounds per acre and going both ways.

There are two seasons for seeding, late May or early June and August. In limestone sections, some excellent stands have been obtained by seeding with wheat or barley. As a rule, however, better results are obtained by seeding alone. In case of late Fall seeding a bushel of oats has helped materially in forming a growth to hold the snow during the Winter and prevent freezing out.

When alfalfa is properly seeded three crops may be reasonably expected the year following, the seeding giving a yield of from three to five tons per acre per year. Under particularly favorable circumstances higher yields that this have been averaged over considerable areas.

The curing problem is no worse than that of heavy clover. There has been a tendency in the East to leave the first cutting of alfalfa too late. The first blossom, or the first new shoot from the root is an indication of the time to begin cutting. This usually occurs during the late warm spell in May which we designate as Corn Planting Season. A tedder should be used immediately behind the mower and if the contour of the ground will permit, a side delivery rake does very effective work. Two windows thrown together will under favorable weather conditions permit sufficient curing so that it may be drawn directly from the windows. However, we Eastern farmers should provide ourselves with sufficient cock caps to insure good protection in unfavorable weather. Cock caps sufficient for one-third the crop is sufficient. The hay sled device in common use in the west seems to be naturally adapted to our Eastern conditions. This device consists of two long runners arranged like a stone boat with a hay rake over which one sling is placed. One man takes this rake fills the rack as high as possible and drives directly to the stack, using his own team to work the horse fork. In case of a short haul more hay may be taken to the stack than in our usual form.

Much has been said about the value of alfalfa, and the truth has rarely been exaggerated. Its deep tap root breaks up the subsoils and adds more humus than perhaps any other plant. As a soiling crop it cannot be excelled because it grows continuously during the season and provides a succulent food for the entire growing year. Its feeding value is usually high. The United States Department of Agriculture quotes it as worth on an average of $20.16 per ton as against clover hay at $14.12, timothy hay at $9.80 and wheat bran at $22.80 and giving it an exact value with shelled corn. Our personal experience in the East have confirmed these valuues.

It has proved an excellent feed for horses where used intelligently. Some two years ago I tried an experiment on one hundred mules fed with one-half alfalfa and one-half timothy hay and one-half a grain ration which was fed to another one hundred mules fed similarly, except the alfalfa hay, and those mules which were fed alfalfa did more work and came through the experiment in much better shape than those not fed alfalfa, while a saving of feed of 25 per cent. was effected. For young stock it builds a strong bone as well as develops the animal rapidly. In experiments along our line in feeding to the dairy cow, there is repeated testimony that when alfalfa is substituted in part for other hay that the milk flow is materially increased. It does not seem advisable at present to pasture alfalfa except with hens and hogs, but for those it proves a most excellent pasture. In the West it is customary to average ten hogs for each acre, feeding addition about one pound of grain per hog per day. It is an excellent pasture for poultry or bees.

Alfalfa has done more than any other one thing to accentuate the value of limestone soils for agricultural purposes. The spread of this crop on land where it has been grown is very rapid and will be still more rapid in the near future. Undoubtedly, the use of lime has materially widened the area in which alfalfa may be grown, but there is still a large area of our country where the soil is too thin to grow as we now know it. The efforts of agricultural scientists and extension workers of the future will be largely directed toward adapting a variety of alfalfa to the hardpan soils where it cannot now be grown. In our efforts to do this we have much encouragement. Many varieties have appeared probably by accident, from the old world heretofore unknown in this country which has characteristics that seem to fit it for this hardpan land. Among these, perhaps the most promising, is the Grimm which has developed a tendency to bud just beneath the surface of the ground instead of at the top of the crown. This tendency allows it to make a spreading root as well as the tap roots, which serves to hold it in the ground during the freezing and thawing seasons which has in the past killed the alfalfa in the wet, hardpan soils.

Our railroad has, during the past year, contributed to a considerable number of farmers a small amount of this seed for trial and for the purpose of growing seed at various points along the line for distribution around these centers. The Baltic, Old Greeley and Variegated seed have somewhat the same characteristics. They have been called to our attention because of the fact that they have held the ground throughout the Winters that have killed the ordinary varieties. There are some faults to these new varieties, such as a tendency to lodge easily. But this will have to be overcome by seed selection.

Alfalfa is bound to become one of the two or three most important forage crops of the East. It should, however, be kept in its place. Some of its over enthusiastic friends have substituted it for clover in short rotations. Alfalfa cannot, in short rotations, develop as much root or top as the red clovers. It does, however, fit better into a long rotation than the red clovers because when it once becomes settled it will pulverize the sub-soil and its final effect will be much more beneficial than red clover.

Its main value lies, therefore, first, in long rotations where it may be kept down for four or five years. Second, as a farming crop which may be harvested year after year. Third, as a pasture for hogs, bees, etc., to which it is adapted in its present form, and we hope later to extend this to horses and cattle by the adoption of a new form to which I have referred. It is a crop that has been of wonderful value to agriculture up to the present time, but its extension and adoption has only begun and we look for even greater benefits in the future than we have in the past.

We know now what we can do. The yield of alfalfa is something about which I hardly dare talk, we hear such extravagent stories, few of which are badly exaggerated. I will begin at some of the largest. I have known actually of nine tons of alfalfa being taken off of an acre. Further explanation is due—that field was specially prepared and top dressed several times with nitrate of soda and water was applied as it should be.

A Member: Was that grown in the East?

PROF. STEVENS: That was grown about three miles from Syracuse; four cuttings. Over a considerable area, I have known alfalfa to average 5.22 tons per acre of well dried hay, actually weighed. We have along the line of a railroad with which I am connected, two farms, each of which has 200 acres in alfalfa, and they have averaged 3 1-2 to 3.75 tons per acre over the entire acreage. That was three cuttings. May I say right there that occasionally we can, here in this State and the neighboring states north, get four cuttings, but the average is a little over three; and in the majority of cases we get three.

A Member: Do you think that can be done and do justice to the continued life of the crop—take more than three cuttings?

PROF. STEVENS: In general, no; occasionally, yes. May I follow up that thought? We are apt to leave the first cutting a little too late in this section; that is, it becomes too woody and too large. If we cut it a little bit earlier, the moment you can see the first signs of life in the new buds at the top of the root, and that will come when the first of the buds are forming at the top and comes in late corn planting seasons; in normal seasons—this is not normal, it is too dry—if we take that cutting at that time, to give the second crop, the benefit of the rains likely to follow, we are likely to get four good crops and the quality of each will be better than if we left the first crop till it came to maturity.

A Member: How much of that land was two or three-year old plants Does it yield as great after the second year?

PROF. STEVENS: Yes, the field that averaged 5.22 to the acre, that was last year, 1912 was the second year that it had been cut. It was seeded in April 1910 and it yielded 5.22 tons to the acre in 1912 and bids fair to come up to that record this year.

A Member: I have had records as good as that the first year and also the second year, but never got it the third or fourth year; I don't seem able to hold it.

PROF. STEVENS: What is the type of soil?

A Member: Clay.

PROF. STEVENS: Is it well drained, deep?

A Member: Yes, fairly.

PROF. STEVENS: It's subsoil drainage I have in mind. The field yielding 5.22 tons per acre was tile drained over the entire field.

MR. SEEDS: In my State, at the present time, I am employing the best methods in a field fourteen years old, in Pennsylvania, and the longer it continues, the less it produces; you don't get as many tons, the older the field is.

PROF. STEVENS: I thought you were trying to get ahead of the story I told about that field seeded in 1849; I thought perhaps you had changed that statement. Couldn't you stretch that over fifteen years, some, Brother Seeds?

MR. SEEDS: How much does that yield per acre now—seeded in 1849?

PROF. STEVENS: It is practically gone, but there are stalks all over the field from the same seeding.

MR. SEEDS: How long is it practicable to keep ground in alfalfa, in your experience?

PROF. STEVENS: Twelve to fifteen years. We have that data gathered from Onondaga county, New York, where it has been a general crop for 20 to 25 years.

MR. SEEDS: In cutting alfalfa, do you cut it one, two or three inches from the ground?

PROF. STEVENS: Don't cut it too high, there is no object in it. I'll split the difference there.

Now, one word regarding curing; the curing problem is the one thing that has been brought up as a stumbling block more than anything else. It should be treated, of course, the same as clover hay. If a tedder is used, it should be used directly behind the mowing machine, or you will lose a good many leaves. A side delivery rake is one of the very best tools for gathering alfalfa, because under good curing conditions, where you can throw too windows together, you can cure it there without the necessary cutting, and that is what shakes off a great many of the leaves, but you have to have very favorable curing conditions to do that; if not, you should provide yourselves with cock caps sufficient to cover one-third the area you have in alfalfa, and use them, because the constant shaking out of the alfalfa to dry it out is very detrimental to it.

A Member: What methods would you use for curing the third crop in alfalfa, of 1911 and 1912?

PROF. STEVENS: Well, a great deal was spoiled, as far as the color goes, there's no question about that. In the dairy districts, in a great many sections, the farmers keep up the silos and cutting machines, and whenever a crop is badly wet, they run it through the cutting machine and put it in the silo, the same as they do with clover hay. Others have used the cock caps where they have no silos, except where it has to remain on the ground several days, then it is best to take a fork and pull it from one place to another, else it will kill out the roots underneath.

A Member: When is the most favorable time for planting alfalfa?

PROF. STEVENS: Twice a year, May or August. Don't plant it in the mid-summer months; dodge the latter part of June or July.

A Member: The best result I ever got was from a stand seeded the 26th day of June.

PROF. STEVENS: Well, you happened to have favorable rains. We usually get a drought in August, it's a little too hot for it to start at that time. If, preceding that drought, you can get its roots down into the ground, it will hold during the drought. Again, if put in August, it has a show.

A Member: I have arrived at the conclusion that August is the best for our locality.

PROF. STEVENS: Many sections report August seeding most successful. While I am on that subject, I want to say a word or two regarding the harvesting. Some few years ago I went throught the West to study this condition, there of course they haven't the rains. in the Far West. Through Western Nebraska they can depend upon their rains more than we can here, knowing about when they will come, but I found methods of harvesting there that were more successful than ours. There is a stacking problem here; the alfalfa should be put near the barns, other things being equal, on account, first, of the large haul, and then this point which I bring up. On the ranches they did not use wagons for hauling, they used "stone bolts," arranged two, poles—I presume we would use two by fours; they had stripped off the mountain saplings about the size of a hay rack across—it was a little rack, just a stone bolt arrangement, and they would hitch a team to that and one man would take it and go along the side of a double row and load it as high as he could and take it in, then unhitch his team and go back and bring in another boat, so one man worked a team and a stone boat and there was nobody in the field pitching on it. It seemed to be an arrangement which could, under favorable conditions, be worked here, although if the haul was long or over rough ground, it would not work.

A Member: How long was the test you have spoken of carried forward?

PROF. STEVENS: Something like three to four months.

A Member: You said alfalfa could be fed to horses if fed intelligently; what do you mean by that?

PROF. STEVENS: In Pennsylvania, if a man is feeding on a grain basis, instead of timothy hay basis, alfalfa, with its immense protein content, if fed to excess, will throw burdens on the kidneys that they cannot carry, and so you will see a disturbance in the kidneys as well as the bloating effect, if fed in excess.

A Member: You don't mean the hay?

PROF. STEVENS: Yes, I mean the hay, if fed to excess, will throw burdens upon the kidneys. Its comparison is with wheat bran instead of timothy hay, and so, in starting, it must be used with considerable care.

A Member: Did you ever find any difference in the quality of feed in different sections of the United States?

PROF. STEVENS: Yes, I'm coming to that. Experiments in feeding to dairy cows have shown that when alfalfa is substituted in part for other hay, the milk flow is considerably increased. I have no doubt but what, in the near future, we will develop by selection types of alfalfa which has a spreading root, which will hold upon the hardpan lands of which we have so large an area in this State and in southern New York.

A Member: Well, in plowing up your home plots that you seeded a number of years ago, don't you find that conditions at the present time?

PROF. STEVENS: You will occasionally find a plant standing, and where you do, you will find that it has a spreading root.

A Member: But in plowing up an entire plot, when you have occasion to pull one of them up, haven't you found that many of those strong and extending roots are devoid of the full edged tap root system?

PROF. STEVENS: Occasionally you will find that type of root.

A Member: I have a plot now seeded in potatoes that stood for five years that I would like to have you see. I think it evidently represents the type of root we are hunting for.

PROF. STEVENS: I hope that a great deal will be done by our extension department in this line. Along the line of our road, a great deal of seed has been distributed.

A Member: In the alfalfa matter, a man having a desire to successfully seed in alfalfa—take a series of years—have you had serious trouble with the fox tail or native grasses crowding out the seeding.

PROF. STEVENS: Fox tail seems to bother more than any other kind. The best treatment I know of is, after the first cutting, to go over it with a spring tooth harrow; it is better that it be taken to a blacksmith shop and pointed before using.

A Member: You are all right, I've done that repeatedly; I have used a brand new harrow.

PROF. STEVENS: But the pointed tips are better still.

A Member: Have you ever experienced any trouble with your alfalfa roots growing over a tile drain.

PROF. STEVENS: Only on one condition, where it comes from a living spring; then the alfalfa roots will tap it. Where it is dry, the roots will not tap it.

A Member: Have you any knowledge of inoculating material?

PROF. STEVENS: Yes, there are several cultures that are reliable. The greatest difficulty is that they have not been properly used. Practically all are reliable—those on the market now. I think that if land had been limed before, it would not have to be limed again.

PROF. MENGES: The Committee on Resolutions would like to have any resolutions that anyone desires to be presented here. You can hand them to Dr. Conard, Mr. Schultz or myself. I wish you would attend to that this evening or to-morrow morning. Any resolution you would like to be presented at this meeting, please hand them to one of the men named.

The CHAIRMAN: Next is an illustrated lecture by Mr. H. B. Fullerton, Director Agricultural Development, Milford, Long Island, on the subject, "Best Agricultural Opportunities are in the East."

Mr. Fullerton spoke as follows:

## BEST AGRICULTURAL OPPORTUNITIES ARE IN THE EAST

By H. B. FULLERTON, *Director Agricultural Development, Long Island Railroad Company, Milford, Long Island.*

(Address illustrated with stereopticon slides.)

Neighbors: Horace Greeley, years ago, advised young men to go West, and the Sage of Chapaqua was a very wise man. If he had lived today, he would use his well-known powers of persuasion to coax American youth to stay East, and also bring the soil tilling youth of Europe to our Eastern States in order to assure adequate food supply for our now underfed Eastern cities. Our great country has outgrown itself in many ways. The most remarkable, most important and by long odds the most interesting item to each and every American, no matter what his standing in life may be, is the existence of very perplexing and vastly injurious state of affairs which, at the present time, is working, readily rectifiable hardships to the consumer in particular.

The title given my address is up to the present time merely a statement, and statements are of little value indeed in this day and generation; therefore, with the aid of a goodly number of self-taken photographs, many of them colored by my very willing and extremely efficient life partner, I aim to prove to the most skeptical mind present that the statement is fully warranted by facts.

America, possessing, as it does, the finest, most highly developed method of transportation now before you in the shape of an American limited express, has made it possible to bring from far distant regions food supplies, many of which should be, for manifold reasons, raised on the idle acres, of which millions lie close to the great markets of the East. This picture, for example, is a sample of 270.000 acres that, in 1905, existed from thirty to sixty miles from that greatest of all markets, New York City. Practically all of it had been in the market for generations at a price of from one to six dollars an acre, with no takers, Long Islanders, for two hundred and sixty odd years had said it was valueless, and this unbiased statement had been strangely enough reiterated by scientists and experts of State and National repute.

Strangely enough Nature's refutation of off-hand statements and deeply learned argument had been persistently over-looked or set aside, for the remarkably close and vigorous growth now before you is that of a single year; sprout oaks of every description, huckleberries, sweet fern and numerous other shrubs shown above, annually, for 150 years had been burned to the ground. Sprout oak growth from the stumps of once existing monarchs does not make from five to seven feet growth in a season, except under particularly favorable conditions of soil and climate. And it was this self- evident fact that caused President Ralph Peters of the Long Island Railroad and those to whom he entrusted the work, to tackle what they alone considered an easy job, that of definitely proving that Nature was right and man-made tradition and man-evolved theory were absolutely baseless.

Our method of procedure was extremely simple and economical as well and again reliance implicit was placed on Nature's teaching. This rock and varying plant growth upon and about it illustrates exactly the fundamental principles of successful plant growing, illustrating as it does the history of the world. From the rock came the mineral elements which make up our soils; through the action of wind and water, heat and cold, its particles were distributed. Lichens, with which this rock is covered, represent the lowest form of vegetable life, eaking out a bare existence from air and water, with trifling aid from the hard substance to which it clings, dying or torn from its foot-hold, it fell and lodged in a crevice or split of the rock, and with this slight addition or organic life a higher form of plant growth appeared, yet a rather insignificant form of fern, which, when its life was over, fell to the base of the rock and furnishing more abundant vegetable matter to decay made possible a still higher and better form of plant growth, which, in its turn, as eons rolled on, enabled Nature to produce that highest form of plant growth, the stately tree.

Knowing that Nature was the best of all teachers, we unhesitatingly followed her methods. As Nature had plainly indicated, we found three feet of soil where man-made theories had proclaimed a depth of half an inch. It being shown that the rocks had been thus liberal with the mineral elements, we looked for signs of vegetable matter. It was totally lacking; at least upon the surface, for the annual forest fires had destroyed the falling leaves and dying annually as fast as they had been dropped upon the soil. To supply this lack in time for the coming season's growth, stable manure only could be used, for it was September 7, 1901, when the work was started, and while knowing full well that from twenty-five to sixty tons of stable manure was used by successful growers, we felt that we must confine ourselves to the least possible quantity. Deciding that ten tons of stable manure would furnish sufficient organic matter to insure our first crop, which was rye, we purchased this at 95 cents a ton, delivered, which included, of course, the freight charges. In thirty days, by the use of that quick acting persuader, dynamite, we cleared, plowed, harrowed and drilled in a crop of rye and soon had the inexpressible satisfaction of having Nature prove by a lusty growth that she was right.

Because of the always existing lack of fresh food supply in New York City and Brooklyn, the ten acres were laid out during the winter for market gardening on the intensive plan so common in Europe, so little followed in our own country, although it is recognized as yielding the highest returns per acre of any other soil-tilling plan. From the beginning of our work we had determined to keep up the income throughout the year, and not to follow the common method of income for a few weeks and outgo for the balance of the year. Our first crop was sea-kale, more impetuous than even asparagus, with us lifting great slabs of frozen earth in order to get its delicate light green leaves and glistening white stalks into the open air.

A double-barreled food is this, furnishing the much craved greens and stalks for stewing and creaming. Asparagus follows closely, and is a big income producer. Rhubarb, by a little coaxing, using discarded nail kegs, half barrels or boxes with the bottoms knocked out, make cheap and wonderfully effective forcing houses, furnishing long, thick, juicy stalks weeks before the crop can be gathered from plants left exposed to the early spring cold nights. Early tomatoes were decided on to be the intercrop of the acre planted to fruit trees. Observation has taught us that tomatoes set out from rows or even where transplanted showed marked objection to disturbance and did little until all root injury had been repaired. We felt that transplanting into earthen pots or wooden boxes would not insure against this injury, and selected the hard-pressed smooth surface paste-board pots manufactured in the Bay State. A most fortunate selection this proved, for we gained just three weeks over transplants made in accordance with common usage. By packing selected fruits in "four-quart" boxes we obtained for a crate containing less than 24 quarts $1.50, when neighbors, shipping in bushel crates were getting returns of 8 cents a bushel which at that time meant a loss of 4 cents on the crate alone. Besides raising all the regular varieties of plant food we sought far afield for the favorite food of other countries.

In this quest we were ably assisted by David Fairchild, head of the United States Bureau of Plant Distribution, and later, by many other unknown Nature-loving friends throughout the world. We found a most beautiful delicate and eminently satisfactory cabbage, particularly suited to the making of cold-slaw of superlative quality. We found a member of the cabbage family superior to the majority of plants obtained from the sowing of the early Jersey Wakefield. A member of the flat Dutch family, as this picture shows, the regulation wheel-barrow fully occupied by a single head demonstrates its value most persuasively. Every head in a field of this "Allhead" strain is cut before the side-by-side field of Early Jersey can be entirely cropped. Endive, so frequently called escarolle, is grown with ease, as these baskets of handsome, well-blanched specimens attest. The simplest form of blanching we discovered is the use of salt hay or even a loose covering of rye straw. The French, or Globe artichoke, an epicurean delicacy, now largely supplied by Belgium, offers a most attractive method of income production. This big thistle, cut just before the bud opens, blooms a second year. It is not tender and winters with ease except in an open-winter country like our own, where snowfall melts and night freeze may all come within 24 hours. To protect the crown against injury we find that a couple of oak branches or any other roughly constructed pyramid is ample.

In the great Sakuragima radish of the Japanese we found a worthy vegetable amply repaying the most distinguished consideration. It is a winter radish and it should be planted late. In flavor it rivals the French breakfast. In size it is a giant, reaching with us the maximum of 42 pounds. In texture it resembles the apple; its great leaves frequently reach a length of 4 feet and furnish greens as well as stalk for stew. Its flesh can be eaten raw or sliced and cooked like turnips. It winters splendidly, and appeals to practically all tests. Cauliflower, a vegetable known to but few, and held at prices making it a luxury, thrives best when close to the benign influence of salt water. With such condition Long Island is particularly blessed, but New England has ample shore line which, for those willing to give the special care of cultivation and blanching of the head, will secure ample returns. The Giant Gibralter onion, the best strain we have been able to obtain, of the famous Bermuda onions, ancestors is grown as easily and as cheaply as the rank R of Weathersfield, and brings the highest price of any onion on the market. Two and three pounders are very common and needless to say command a most attractive price. Whitloof Chicory, called "endive" by Americans, serves well to keep up the income through the coldest of our months. Grown in the open to secure the largest roots possible its leaves are cut off in the fall and roots set in normal position in the sand floor of cellar or roof shed. With but slight attention beyond the cutting we have secured five crops during the winter.

Good berries are rare. Indeed, for ability to stand long distance shipping, is the sole quality sought by raisers. Here you see two representatives in their peculiar classes. The Heritage, an immense mis-shapen monstrosity, brilliant in color with a wealth of calyx, but merely medium in quality, while the Conical Chesapeake is the finest in quality of any strain we have so far discovered. Strawberries, no matter what their variety, should be attractively packed and none but first-class specimens permitted to leave the farm. A trade mark, backed by such business procedure, will quickly work up a lucrative trade. The raspberry is one of the extremely good things that has almost been forgotten. Even the red one, the most commonly raised, is supplied in quantities far below the demand. The black, almost unknown in the East, quickly becomes a favorite wherever it is used. The yellow is extremely rare and its acid tendency is against it, except as a contrast and combination for serving with the other varieties. We find Cuthbert the leader of the red in quality, and the Cumberland of the blacks, and Golden Queen is the finest yellow we have discovered.

Fallow indeed is the field for cantaloupe growing. The bulk of the supply now travels great distances and is of a variety mainly noted because of its ability to ripen after being picked from the vine. Both the Fordhook and Burrell gem are far superior and the nearby grocer would quickly control the market. The family Giant, called the Montreal, is of value only because of the size, but one strain, the Mount Royal, being sweet or of good flavor. Canada practically controls this $36 a dozen brand of melon, yet it can be grown with ease in the Eastern states. The varieties of watermelon shown are the Kentucky Sweet and its near relative the Halbert Honey. Tom Watson, a late introduction, proves all around superior to even these. This group of Long Island fruit proves beyond any question that the East need not step out of its own territory for the finest apples, standard or crab, the most lucious of pears or plumb, the ideal quince, superb grapes or the out-of-season fall strawberry.

The planting of fruit trees offers today as always a magnificent opportunity. To say that it will be overdone is simply silly. Statistics show for example that of the thousand of fruit trees set out by land developers, etc., less than 5 per cent. survive at the present time, and the bulk of these will never be handled in a way to cause the slightest effect on the fruit market. Many hold back from orchard planting because, as frequently stated, it requires a life time to secure income from them.

The following pictures, illustrating the Japanese plum tree's history, certainly refutes this statement. Here an 18 months girlie is assisting the planting of a whip-like tree. Two years later we find her sitting in its shade with here and there a ripened plum above her. The following year it is heavily laden as the illustration proves. Japanese plums are close to the ideal, as we find on examining the contour, the rich color of the flesh and the delightful luscious flavor. So, whether it be that superb eating specimen the Ekuri, the heavy bearing Botan, or the marvelous preserver the Satsuma, we find an ideal quick income yielder for use as fillers in the apple orchard. And this small boy shows us another excellent filler the peach. This particular variety being the Greensboro, a hardy, extreme early very prolific, high quality kind. The hand cider press suggests another way of filling the unfilled longing for real cider, made without calling in the experts of the chemical laboratory.

It seems that the days of the sweet American chestnut are limited, and like many other of Nature's creatures it is to become a thing of the past. In seeking for a nut to replace it since I endeavored to check the fatal blight with Bordeaux in 1906, the most promising variety is the one shown here, the Japanese walnut. It combines the good points and leaves out the bad of both our American black walnut and the butternut. A beautiful member of the cow family opens up the many channels of income production, butter and cream and milk, for their demand must ever increase each year more rapidly is but inadequately supplied today; really good butter is today but rarely found even at exorbitant figures. Cream is but for the fortune favored and milk in scant supply. Besides all this the cow in days gone by aided greatly in keeping up the fertility of the farm and the waste from the stable combined with such crops as the legume here shown, crimson clover, will bring every Eastern acre into annual production far exceeding anything known in the past. Alfalfa, another wonderful soil up-builder, whose wonderful versatility has been known for ages. Besides gathering and storing away in the ground the nitrogen of the air, yields on Long Island from 5 to 6¼ tons annually, furnishing three cuttings always and sometimes four, changing the color of butter from white to yellow, frequently within 36 hours, increasing the milk supply always, producing pork so fine in texture and so sweet as to yield a return of 2 cents above the corn fed article. A notable inciter of poultry to egg production, and even as a flower a thing of beauty and a joy forever.

This hardy long lived plant presents, then, great opportunity for Eastern soil tillers. The newly finished barn built for the production of pure milk shows that uncompleted dairyman's friend, the silo being filled by power supplied from the hub of a Western high-wheeled motor wagon, one the cheapest sources of mechanical power we have discovered, able to carry a ton's load over country roads, fill a silo or draw crops from the field. The simple milkhouse with running water drawn from the tank supplying the farm, which, coming from a driven well only 68 feet deep, is handled much, as were the old spring houses, the water coming from below hardpan arrives at the surface at a temperature of 49 degrees, and even on the hottest summer days holds our milk at a temperature of close to 60 degrees. In this little house was made the butter that in State-wide competition scored 99½ points, the highest ever obtained and this by my life partner, a butter maker of but two years' standing. Her butter in competition with the Nation's butter makers at Chicago in the same year, 1912, brought her another medal. For feed and for filling of the silo, corn is still King, and the varieties from which to select are many, from the small-eared, light-yielding, very hard flint, of main value because best suited for grinding into corn meal, through numerous semi-dents to the dent, the biggest yielder and most suitable of all varieties for animal food.

As the proof of the corn is in the shelling, I place before you the relative merits graphically illustrated. Here the biggest cob gave the greatest yield of shelled corn. This particular strain was the Eureka, available for Eastern growers. All good men and true know full well that the one thing most necessary to a farm's success is the home, and its manager, whose work is never done, and this home, be it ever so humble, should receive far more attention than is bestowed by the average man. Every possible attention and care should be given to keep it beautiful, bright and cheery. Money should be feely spent, if necessary for vines, for shrubs and for flowers. As a matter of fact small indeed is the outlay of money necessary and great indeed is the happiness to be secured. To woman-nature and that of most men, flowers mean much, and flowers also are a source of splendid income. Pansy plants grown for city dwellers supply a large part of many a family's income. The sweet pea, most prolific, and bearing throughout a long season when its roots are protected by mulch, pays big dividends. Fifty-five hundred blossoms were picked per day from the small patch shown, and arranged as women alone can arrange flowers, find a ready market. In the center of this bunch of beauties is a Fourth of July bunching, red, white and blue. A few moment's more time spent trebles the value on Independence Day. In the foreground you see the variety with yellow tint, to gain which Eckford, the famous English sweet pear raiser, devoted his entire life. This easily raised purple aster supports on four and a half acres an Armenian and his large family. Yet to many such a crop would seem picayune indeed. Yet numerous hardy other varieties, which would do the same, or far better. The chrysanthemum, the cone flower, daisies, violets, and many varieties of the sun-flower family.

Eggs present boundless opportunities at present, the supply being most erratic and coming from sources far afield subjected to speculative manipulation and masquerading months and years later under wierd designations in which the word fresh is erroneously placed. The parcels post helped some, but adds, under the present crude and high priced stage, almost a cent apiece in taxation upon the consumer. This group of vegetables and fruits, raised upon the idle acres shown you at the beginning of the address, by adding $9.50 worth of stable manure and 800 pounds of lime, aided in bringing back to Long Island from New York's State Fair 117 prizes, and in competition, locally and in other states, proved conclusively that the acres lying idle on Long Island are not only extremely fertile, but capable of producing big crops of the highest class of plant-food life, and beyond this, because of their close proximity to the consumer, need fear no competition from far-distant belts of any description.

The developments of the last few years has demonstrated to us most clearly that those American monarchs dubbed "peach kings" "onion kings" "alfalfa kings" etc., are giving way rapidly to the reign of queens. It was a woman that lead in apples; it is a woman that stands supreme as a market gardener, and it was a woman whose strawberry plantation led all the rest in the year gone by. The unpleasant rotund over-headed individual who holds between his feet the market built by the people for the people, is the portrayal of cartoonist Harding of the Brooklyn Eagle of the five to seven unnecessary speculators amassing unearned wealth by the utilization of capital belonging to the producer and the consumer.

To the producer he hands a minature bag of pennies, in exchange for a liberal hamper of garden truck, while with the other hand he disburses to the consumer a basket of trifling size demanding therefore a mammoth sack of dollars. Like other things unnecessary to human welfare concerted effort of the two classes comprising the majority of these United States will quickly and most effectively wipe the food speculator out of existence. When we strike a snag we root it out. When we strike a stone wall, we go over it.

The Long Island Home Hamper herewith portrayed clearly demonstrates how we as producers landed directly in the kitchen of America's biggest city of consumers. This package, developed in 1906, has already built up a national reputation and place for itself, for it is a common-sense method of solving the very serious problem confronting both producers and consumers. For it we receive one dolar and a half, cash. It comes under the perishable matter express rate and is taken by the express company from the farm station to the city consumer's dwelling, for twenty-five cents. It is under the specified minimum, weighing on the average 33 pounds. It consists of 6 four-quart boxes, with a wooden separator between the two tiers of each three, and a cover made fast by the regulation crate-fastener. In small quantites the crate, which is the Georgia carrier, with 6 four-quart boxes, the separator and the cover, costs 18 to 18½ cents. The paper used to cover the contents of each four-quart box; the label on the cover, substracted, with the express charge, from the gross, $1.50, leaves us 98 cents for the hamper. In making shipment of similar items in bulk through the city speculators we found that 6 cents was the average received for the contents of the hamper, thus the producing end gained just 92 cents by using the Long Island Home Hamper. Consumers tell us that the contents of the hamper they find can be duplicated for from $2.20 up to $4.50, thus while saving the producer 92 cents we are saving the consumer from 70 cents to $3.00. Needless to say, the Home Hamper is not patented and it gives me great joy to announce that many who have adopted it in various sections of the United States are not only gaining but giving happiness as well. Another illustration of the Home Hamper, showing the fillers from which we draw late in the season. Tomatoes of course being pulled up from the field before frost catches them and stored in a shed in the old-fashioned way.

The public market, completed in many places throughout the country, under way in others, and being fought for in still others, is another solution of the problem, but only when dedicated to the public for the public, and only producers on their local and fully authorized agents are permitted a floorhold or stall therein. The market shown is one to be erected at Long Island City, New York, equipped with the ice-plant for cold-storage purposes, and as you see, so situated that no monopoly of transportation is possible. as it is reached by even sea-going vessels, by trolley, by team, and by railroad. Of all the manifold advantages of earning a livelihood in the country, none surpass the family life only possible to open air income earners. Here alone can the father have the ideal companionship of his life partner. Here alone can he grow up with his children and really and truly know them, and further the soil-tiller's life is the only one where the whole family can work in partnership. For these and the many other reasons called to your attention everyday is Thanksgiving on the farm and the pumpkin pie, that symbol of American thankfulness, can be deep in filling and liberal in size. Add to the Golden Rule this following verse, by Amoretta Fitch:

"Now I get me up to work,
And pray the Lord I may not shirk;
If I should die before the night,
I pray the Lord my work's all right:"

And I do not have the slightest hesitation in guaranteeing that each and everyone of this audience who really loves Nature and her work will acknowledge that the title of this address was fully justified and may they find in the proofs presented helpful suggestions for their own world's work.

The meeting then adjourned until Thursday, May 22, 9.30 A. M.

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Washington, Pa., May 22, 9.30 A. M.

Hon. A. L. MARTIN, Chairman.

The CHAIRMAN: Before opening the Institute proper, I may say that we are in receipt of a number of letters from County Chairmen of Institutes and lecturers, who, by reason of sickness and other unavoidable causes, have been prevented from attending. A very interesting letter from a gentleman with whom we are also associated, Hon. Thomas J. Philips, of Atglen, Chester county, has been received. He writes that, "While I am steadily growing stronger, eat and sleep well, I walk out every day, I hardly think it prudent to attempt to travel so far as Washington, Pa. I regret this, would enjoy meeting all my old friends, hope you will have a pleasant and profitable meeting." Mr. Philips has been afflicted and has been in in the hospital for some two or three months, but is recovering. We are also in receipt of a letter from another of our familiar workers, not only one with whom you are well acquainted, but one of the eminent writers for the National Stockman and Farmer, L. W. Lighty, who states that on account of sickness of Mrs. Lighty, who seems to be lying close to death's door, he is prevented from meeting with us and sends his kind regards to all. We also have a letter from Mr. Warburton, of Sullivan county, stating that on account of an unexpected call, he is prevented from attending. We have still another letter from Washington, D. C., Prof. Welles W. Cook, who has traveled all over Pennsylvania in attendance at our Institutes and schools, saying that on account of official work in the Department with which he is associated, he is prevented from attending and sends his cordial regards.

We are expecting, and, as you will see by the program, have announced this froenoon as the "Good Roads Session." You will further see that placed on this program is the Governor, our Senior United States Senator, Hon. Boies Penrose, Senator Bourne, of Oregon, the State Highway Commissioner and others, and the "Dirt Road" advocate, Hon. Edward E. Jones, of Susquehanna county. We have information that this delegation is expected to be in the city a little after ten o'clock. Now, until that hour arrives, we will take up that part of our program relating to Farmers' Institute management. You know that is a thing we can cut off most anywhere and we will proceed with same until the delegation arrives.

Before entering upon this work, I may say, incidentally, that the past year was, in some respects, a phenomenal one in Farmers' Institute work. This work was carried on, and meetings were held in every county in the State on the meager sum of twenty thousand dollars, twenty-two thousand five hundred having been expended the year previous, spread all over Pennsylvania, to pay hall rent, expenses of the lecturers, local expenses of the Chairmen, and so forth. We got through with that, but some of the County Chairmen and a number of the speakers had about come to the conclusion that we have a pretty stingy Director. You know a man has got to be close and a little economical when he has so limited a sum to go on over so broad and important a territory as is under our direction, and hence we should explain that we introduced into the present Legislature a Bill providng for this Division of Farmers' Institute, an appropriation of $55,000, in lieu of $45,000, as was our old appropriation. While this budget, when I left Harrisburg, had not yet reached the Legislature proper, we have good assurance from the Appropriation Committee and the Agricultural Committee and members of the House, that our measure, our budget, will receive favorable consideration. We state that fact in order that those most interested may understand the matter.

Further, we may be congratulated, as workers all over Pennsylvania, on the fact that a Bill was introduced by Mr. North, of Jefferson county, providing for the employment of ten farm experts and counsellors, whose work it shall be to go into the various counties of the State and counsel and advise the farmers relative to their farm operations. I may supplement what I should say, by this, that practically all the farmers of this State represented at our Institutes have sent me resolutions favoring that move. I have on my desk over a thousand letters received within the last ten months, asking that some one be sent to their farms to help them out with some of the intricate problems with which they are engaged there. And now, my friends, the object of this legislation, so liberally supported by the Legislature, only having fifteen votes against it in that body, demonstrates the fact that when the great body of farmers of Pennsylvania ask, with a united voice, for a thing, it is pretty apt to come. It demonstrates the power of co-operation and united effort for a thing seeming to be of much vital importance to the uplift and aid and help that ought to come to the farmer who is endeavoring to adopt the most approved method in farming and, hence, we feel gratified that this fair and equitable request was recognized by the great legislative body of Pennsylvania.

Now, my friends, when I begin to talk about Farmers' Institutes, I sometimes forget where to stop. This meeting was aranged in order that the men who direct Farmers' Institutes in the counties, the men who lecture at Farmers' Institutes, should have full voice in the discussion; and, hence, we throw this meeting open for full and free and fair interchange of opinion.

A Member: As this session is one of great importance and not for long speeches, I suggest and move that the main speakers be limited to ten minutes and the answers to questions, to two minutes.

(Motion seconded).

The CHAIRMAN: It is moved that those who lead in discussion be limited to ten minutes and those who engage in general discussion, to two minutes.

(Motion adopted).

The CHAIRMAN: Now don't blame it on me when you get a little long winded, because I will call you down. The first subject, as it appears on this program, is, "A Retrospect of the Past Year's Work by the Section Leaders;" and the first speaker is, Mr. R. P. Kester, of Grampian, Pa.

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS

By R. P. KESTER, *Grampian, Pa.*

The last resolution adopted was certainly acceptable to me. I have been wondering what I should say on this occasion and to what purpose; because after all, you, fellow-lecturers and others, know, that the most acceptable and effective and impressive retrospect that we have in our work is the purely personal part of it, a part that is not intended, and could not be given in a public way to your satisfaction. However, in these few minutes I want to say that the last year's work was, of all the years which I have spent in Institute work, one of the most satisfactory, not because it was spent in what the people of that locality claim to be the garden spot of the world, southeastern Pennsylvania—I am not willing to deny them their claim—but because of the general advance and interest in agriculture that has been made. The Institutes each year become more interesting, more useful and more attractive. I believe that other section leaders will say the same thing. But I want to tell you that the Institutes held in southeastern Pennsylvania, or the First Section, as we term it in our Bulletin, was one of the best, if not the best, session that has ever been held. And that is not due to the section leader or the men who were with him in that section, but it was most largely due to the fact that the farmers of that section, as well as the farmers of all sections, have an increasing interest in their business and an increasing knowledge of their business.

I found the Institutes last year to be better attended and attended by more intelligent audiences than in any previous year. I hope you will understand what I mean by that. I say, I know, that all section leaders can say the same thing, because the farmers all over Pennsylvania are becoming more intelligent each year. The questions asked were more pertinent, more searching, and I want to tell you, fellow-farmers, you know it, that the man who stands up and talks on agriculture to-day must know what he is talking about or make a pretty good bluff at it, at least. There are questions asked to-day that were not thought of five years ago. And I want to make mention of another fact, also, that the Farmers' Institute work has broadened in those few years through other scopes than simply increasing production. We farmers are beginning to understand that agriculture is a life, that it is more than simply producing food, that it is building a home, that it is developing character and all the things that bear on these questions, that bear on the different phases, are pertinent and proper in a Farmers' Institute, and that is one thing that makes the Institute each year increasingly interesting and increasingly beneficial.

I want to say that my helpers last year were exceptionally satisfactory to the people with whom they mingled. I find that the old skeptical attitude, the critical frame of mind, the tendency to quibble and to trip up and to find fault, is largely done away with. Men and women attend Institutes to-day for what they can learn, not simply to show how smart they are. And more than that, Farmers' Institute lecturers today are there for what good they can do, not simply to show how well they can talk or how good looking they are or how long they can talk. There is a mutual understanding and a mutual effort on the part of the Department and on the part of the people of Pennsylvania, to boost and to help the agriculture of Pennsylvania, and I believe we are doing it. As I have traveled over the State, and I think I have been over nearly every square mile of it, the farmers of Pennsylvania look better in the year 1913 than they ever looked in any previous year in the history of Pennsylvania, and I want to claim part of the credit for the Institutes of our Department of Agriculture having brought about that improved condition, and I am glad to know that the people of the State, and the Department as well, are endeavoring to still extend and improve the agriculture of this State. Now it is up to us, it is up to our leaders in this work, you and me, to continue it sanely and to the purpose of making agriculture attractive, of developing the people, of improving the homes; in fact, of teaching all the things that make agriculture the grandest life and the greatest occupation in which men are engaged.

I know I have not said much on the retrospect; I could get quite sentimental on that part. I made some fine acquaintances, some splendid friends. I have received a great many letters since I sojourned in that part. I know that the work was appreciated. I know they made excuses for our limitations and shortcomings and that they were broad-minded enough to look over the defects, and I think well and kindly of the people with whom I associated during the winter of 1912 and 1913, and whatever is to be done in the future I hope will have the hearty co-operation of the people, as they have co-operated in the past.

Just one thing more I want to mention: The one thing in which the people of that section, as well as the people of all sections, are interested and push to a conclusion or to a definite point, is the fact that there is a general recognition of this fact, that the future of agriculture will depend largely on how we direct and outline the education and development of the young people, the children of the farmers of today. Education must begin there if agriculture is to reach its highest estate and the public schools and the other agencies of education must receive our increasing attention in the future. It is one of the largest and most important parts of our business as adults, more important than to try to teach the elements of farming. Now I want to thank you for your attention. I know that I have not told you much, but I simply wanted to leave this thought, a firm conviction with me, that the Institutes have done an increasing work in the State of Pennsylvania, and it shows on the farms, in the homes and in the character of the people of the State.

The CHAIRMAN: Now we are ready for two minute talks. If anybody has a word to say, let them be prompt. If not, the next speaker will continue this subject: "A Retrospect of the Past Year's Work," by Section Leader, Mr. J. T. Campbell, of Hartstown, Pa.

Mr. Campbell spoke as follows:

# A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By J. T. CAMPBELL, *Hartstown, Pa.*

I did think awhile ago I would get up a speech for this occasion and I began to talk with my wife. She said, "You are not going to get up before an audience like that and make a speech with hands looking like yours?" I said, "I can put them in my pockets." I had got busy building a barn, I had four thousand chickens to take care of, and didn't have time to prepare any speech, so you are spared the infliction.

I have been in Institute work about eleven years and as far as I have been able to observe, and I think I observe pretty closely, every year has seen an advance in the work. and the past season has certainly been no exception in this respect, and Section 3, occupying the southwestern part of Pennsylvania, certainly had a season of exceptionally good Institutes. We find this, however, that Institutes are no longer, if they ever were, made up of large audiences and large numbers. Some of our most successful meetings were those where we had one or two or three dozen farmers, all interested in the work. Sometimes, in out of the way places, we fellows didn't have a hotel with a bathroom to stay in, but we got down to work, we could do heart-to-heart work with the better class of the farmers in that particular locality. I think the Institute work in Pennsylvania today and its success is going to be determined very largely by our going out and getting in close contact with the better class of farmers in any community, though that number may not be exceptionally large. I know it is being argued in some places that the Farmers' Institutes have accomplished their purpose and are doomed to pass away. I don't see it that way. If the development follows the lines it should follow, I think there is a great work to be done, without any question. I would like to take up that subject and discuss it, but I haven't the time.

I am going to talk pretty plainly a little bit and I want to take up the subject of the future of the things that have somewhat interfered with our work in the past season. I know it is the intention of the Department to overcome these things to the greatest possible extent. I have no particular fault to find, no personal grudge against anybody, that I want to get up here and occupy the time of this meeting airing it. In a good many places we found that our Institutes were somewhat interfered with, because of the fact that we had too many fellows strolling after us. This was not, perhaps, intentional, but it developed a side in the work that was detrimental to the Institute. In some of the Institutes, we had four or five persons, agents for a paper, and these fellows would line up and the farmer was compelled to run the gauntlet to get out, and this was not for the good of the meeting or the good of the work. I have no fault to find with the agents for the papers; they have done splendid work, and I think if they do interfere with our work, there ought to be some measure taken to regulate these things in future years. One man along that line, working in a quiet way, does not interfere, but when you multiply that, you find it does become an interference in Institute work.

And there are other things that are interfering, sometimes, with the work, which, while good in themselves, nevertheless, because they detract from the main thought of the meeting, detract from the concentration of the audiences, from the things that should be of primary importance in our audiences, and have not been conducive to the best interests of our meetings at all times.

I simply offer that as a suggestion. I believe, fundamentally, the great problem before our Institutes, needs to concern itself with the permanent improvement of the soil, because upon that rests our permanent agriculture, and I think it is proper to offer it by way of suggestion, in view of what I have observed in this work. We could profitably devote more time in our meetings to the soil, and the great problem today in our State is not a problem of greater crops, it is a problem of economic production, and we found in an Institute of Pennsylvania a farmer paying $45 a ton for mixed fertilizer that we figured from the price of chemicals that we knew existed, that it could have been bixed at home for $27 a ton. As long as we find dairy men attempting to feed cattle on a mixture of 50 per cent. cotton seed hulls, we must conclude that we are not following economic methods of production on our farms, and that is the thing that we most need to consider at this time. So the Institute has a problem along that line and there never was a time in Institute work when the farmers of the State paid as close heed and attention to the man from the Farmers' Institute who knows something of the scientific side of the subject and has been able to put it into successful practice on his own farm and get results. He is the man they want to hear and there never was a time when the farmers manifested as little patience with the man who has only a theoretical knowledge to guide him in Institute work and has not been able to put it into successful practice, and that is a good symptom; and if Institute work is going to maintain the high plane to which it has arisen in this State, we will have to look out along this line.

The agriculture of our State and nation has taken a turn that does not look good to the man in the field. You hear a whole lot of people reaching out to uplift the farmer, to pull him out of the great slough of despond. We have all sorts of uplift commissions and all that kind of thing, but they are beginning at the wrong end of the line. You put it in the hands of the farmers of Pennsylvania to grow profitable crops and get profitable prices, and without exception they will uplift themselves in every case, and it seems to me that the wild asses of the wilderness have broken into the green corn, if we might put it in that way, at the present time, and we are making a mistake along that line.

There was the president of one of the greatest commercial concerns in this country a year ago made an appropriation of a million dollars for the benefit of agriculture. In the first or second week in last

March, the president of that corporation, on the witness stand, according to his own testimony, said he had in his employ between four and five thousand girls, and according to that man's own testimony, over a thousand of those girls were not getting a wage that enabled them to lead respectable lives and do the work they were required to do. If he wanted to do something, that million dollars would have gone a long way toward paying a respectable wage to those girls, especially, when, as a matter of fact ,the farmers of the United States were not asking one penny from him, and it occurs to me that some people in Pennsylvania are falling over themselves to get some of that money.

Now it looks like this: Agriculture is fundamental and at the basis of civilization itself; it is the basis of progress and improvement in every line in the United States. That being true, it certainly behooves the Nation and this State, the second wealthiest state in the United States, to appropriate and to use money for the promotion of our agricultural interests, and I think if agriculture is going to be helped, it ought to come in that way.

The CHAIRMAN: The next speaker is Prof. Franklin Menges of York, Pa.

Prof. Menges addressed the Institute as follows:

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By PROF. FRANKLIN MENGES, *York, Pa.*

Mr. Chairman, Ladies and Gentlemen: I didn't know that this Session was to be held this morning and I am not as well perpared to talk as I might be. I was working on a number of resolutions that gave us some trouble.

The Farmers' Institute has arrived at a stage that it has gained the respect of the farmer. I know very well and you know it as well as I do, and you know it probably better than I do, that when the Farmers' Institute was begun, there was a tremendous lot of opposition to it. I know in my own county, and I am talking from experience, I know that in my own county we could not get a baker's dozen of farmers together to attend an Institute. Last year and the year before we had at the Institute in York county from eight thousand to ten thousand farmers. I suppose the records of the Department will bear out that assertion. And not only is that the case, but those farmers came knowing very well that there was going to be something said and done that would be for their benefit. It is true that York county is an agricultural county. The City of York is the third manufacturing or industrial city in the State of Pennsylvania. We have a splendid market for our products, not such as you have in Washington and Allegheny and in Beaver and in Butler and in the rest of the counties surrounding Pittsburg—we don't have a market such as you have, but we have a good market for the products that are produced on the farm, in the City of York.

The farmers have gotten such instructions out of the Institute that they have been able to supply that demand in such a way that both the farmer and the consumer are benefitted by it.

We have a system of markets in the City of York and we have had them for the last one hundred and fifty years or maybe two hundred years, I don't know, but at any rate, for the last one hundred and fifty years, the farmers of the county of York have come right into the town and they have sold on the curb of our city the products that are produced on the farm directly to the consumer. It has made York the industrial city that she is. There was a time when a family could live cheaper off of less money in the City of York than in any city in the State of Pennsylvania. The manufacturers came to our city for the purpose of establishing their plants, because they could get labor there and they could get food for their labor at less cost than they could get it in any other place in the State of Pennsylvania. I say it has made York the industrial city that she is.

Now, my friends, York is not an exception. If the Farmer's Institute has been a factor in developing an industrial city, making it what it is today in one county, why is it not possible for the farmers to join hands in Washington county and make Washington or all these western counties the agricultural counties that they have the opportunity of being? Why, my friends, there is nothing to equal the opportunities that are lying at the door of the people right here. You can produce farm products as cheaply as we can. Yes, you can, no use shaking your head about it. You don't deserve any more for your work than I do and you can't do any more than I can, either. Well now, I say, if the possibilities are here, why not take advantage of them? I held Institutes in this section during the past winter. Maybe I ought not to say it, but I think I shall. I want to say that the farmers of this entire section, so far as their opportunities are concerned, are as dead asleep as they can be. You could not put them to sleep any more soundly, I believe, if you would apply something. How do you like that?

A Member: That's the stuff; give it to us.

PROF. MENGES: Well, I'm glad you say "amen," anyhow. I am not a Methodist, but it does me a lot of good once in a while when a fellow says "amen." Yes, now I say here are the opportunities. The soil is here. Why not take advantage of it, and the Farmers' Institute has been in your section—I don't know how much good we have done, I haven't any idea, only I had the compliment paid me and the men that were with me, and I want to tell you who they are, because I don't want to take all this thing to myself. My friend, Dr. Conard, is here, and my friend, Mr. Fassett, and my friend—he looks a little like a Jew—where is he? Mr. Kline. Oh, there you are. And several others. I say I don't want to take all thos credit to myself, but I had the compliment paid me during the sessions of this Institute, coming from the various counties surrounding Pittsburg, that the people didn't know that there was such a capacity in the Farmers' Institute as was represented in there.

Now, how do you like that? I am not saying this—it comes right to me, and I can tell you who the man is if you want to know, but I won't do it now.

Now, my friends, with all this at the disposal of the farmer, it looks to me that it is time that we should begin to wake up and that we should take advantage of these opportunities that are lying at our door and the Farmers' Institute is bringing it to you. It is the greatest institution for the education of the farmer that has yet been inaugurated. I mean for that average fellow out there, that man that cannot go to college, that man that can afford to take only one or two agricultural papers, and that man that don't understand the business as he ought to; that man that has never had any training except what he got from his father and his grandfather, and maybe they were poor farmers. I mean that man. He is the average fellow and he is the fellow that we have to take and raise him up to a higher standard and that is what the Farmers' Institute is doing, and I want to tell you it is doing it in the most effectual way it has ever been done. I know whereof I speak. Why, my friends, our agricultural college has got more advertising, it has got more help, it has been brought into greater prominence through the agency of the Farmers' Institute than through any agency that has been established in the State of Pennsylvania, including the agricultural papers.

Now, who has done it? That is the question. Why, you have done it, you are the people that have done it. You have done it through the agency of your Department of Agriculture; it is yours, and if it is yours, then the possibilities of what might be done are well nigh unlimited, don't you soo? Just along these lines, you can have the very things you ask for, for the purpose of lifting up that farmer and making him a different kind of a man and solving this great problem that we are talking about; and there is more nonsense talked about in regard to this high cost of living than anything I know of—more nonsense. I told you the proposition is in your own hands. The posibilities, my friends, of the State of Pennsylvania, have not been touched. She has the greatest variety of soils of any State in the Union. Take the soils of the southeastern part of the State, among the most fertile anywhere. Take the soils of the northeastern part of the State, adapted in the most splendid way for the raising of the hay grasses and the dairy industry. Take that wonderful ridge that passes through the central part of the State on top of the Allegheny Mountains—that plateau. And right around the City of Altoona or right west of it,—and then take that wonderful northeastern section where God Almighty raises apple trees without ever any being planted, the very garden spot to produce the finest apple that has ever been made—the Northern Spy.

A Member: You are right.

PROF. MENGES: Certainly I am right, I wouldn't say it if I didn't think it was so. I am not advertising these places, but I say it is the place where this apple can be raised to perfection, and you know that only here and there through that entire section do we find an orchard used for that purpose. And then take our southeastern section of the State of Pennsylvania, where the Secretary, the Assistant Secretary of Agriculture of the National Department, told me himself "Here you can raise a larger quantity of corn to the acre than they can anywhere in the United States"—the other grain section. We can do that kind of thing.

Now, my friends, with all these adaptations, don't you see what a tremendous work there is to be done by somebody to put the farmer in the right relation to his climatic and soil conditions and get him to produce the necessities of life that the nations of the world are demanding every day?

The CHAIRMAN: I call your attention to the next speaker on the program, Mr. L. W. Lighty. You remember I had read in your presence a letter stating that the sickness of Mrs. Lighty prevented that gentleman from attending; hence we will pass to the next speaker on this important subject, "A Retrospect of the Past Year's Work," Mr. D. H. Watts, of Kerrmoor.

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By D. H. WATTS, *Kermoor, Pa.*

Mr. Chairman, Ladies and Gentlemen: It is a pleasure to me to appear before my co-workers in the Farmers' Institute work. I feel, however, like my friend, Mr. Campbell, a good deal like taking this position here this morning, and that is, I am illy prepared. I feel that this is a precious time, when we talk about things pertaining to the Institutes, to their promotion over the State, and on considering coming down here to Washington the other morning, after I had arisen at a very early hour, I said to Mrs. Watts, "Now, if I could only be excused from this duty and remain at home, I would feel a great deal more comfortable. I have a little duty to perform down there, though, and I guess I'd better go." "What would you do if you'd stay at home?" she asked. "I believe today or this morning I would finish building our ice house." It felt a little like that to us up in the hills of Clearfield county lately and our pocketbooks will be minus something next fall, from the appearance of things.

I didn't arrive here in time to hear the opening exercises of this splendid meeting. In thinking about the town of Washington and its location and former history, I could not help think about my earlier career in farming. My first fancy in livestock was sheep, and one time I imported into the county some foreign sheep of a particular breed now very popular, and in order to understand something about the sheep, I had taken a journal, and on almost every page in that journal, which was indeed a great help to me, I found the name of Washington, Pa. This was the shepherds' rendezvous; here they came with their flocks and no doubt with their crooks. Today this is the rendezvous of the agricultural shepherd and his crooks, perhaps.

I hardly know what to say to make good use of the time. I have been for one winter manager of No. 5 Section. I found one man pitching his tent towards the smoky City of Pittsburg last winter and another towards the City of Brotherly Love, and another Mr. Campbell, in the hills of Pennsylvania, and another, Mr. Dorsett, pitched his tent toward the City of Mansfield. And I, with our little band, pitched our tent toward the great commercial metropolis of Scranton. It is a great country up there, a very great country.

Now, what shall I say reminiscent of our travels in that country? At the start we found a very pleasant time. The local people helped us out very tenderly and the weather man at the time assisted. We found a diversity of conditions. We found local people who were liliputians and others who were gigantic in intellect and physical ability both. Perhaps in the people who came, apparently, to help them out, they saw liliputians as well. We found great diversity of effort and results in institute localities. There is something peculiar about that. We would find a place that was wonderfully active in Institute work, the work is a success in every feature, it keeps the Institute lecturer just hoping to keep up with the people in that locality, and we move only four or five miles and find just exactly the reverse,—we can hardly temper our thoughts in language that apparently can be understood by a portion of the audience.

Why this great difference? There is evidence enough that we have still before us a wonderful work to do, and then our study comes in, how to reach all these people? In most of our Institutes we find that the front seats and the "amen" corners are occupied by the same people each and every time. They are the leaders of the community, take an active part, no doubt, in everything that is carried on. Those communities are self-buoyant, but the others, as has been said by other Section leaders, are not.

The Institute work is a wonderful work. The more I think of it, the more I contemplate the field of activity open to us, the opportunities that confront us, the more I see the magnitude of this wonderful work. We talk about the soil, the native soil, and the conservation of soil fertility, the restoring of the worn-out soil, the growing of crops and animal industry, the school and social condition of the neighborhood, and all these things, and in my estimation there is no greater thing today in the rural sections than a general educational and cultural uplift. I believe that because I am the father of a family of six children. I own today a farm and farm buildings that have been hewn out of the forest and the hills with a great deal of labor and expense. Today, viewing life with less sentiment perhaps, than a youth starting out, I would scarcely take a farm in a vicinity of that kind, not to say anything disparagingly of my native county, but I would not take a farm in a locality of that sort as a gift. Now, you may think that is cruel, you may think that is radical, but virtually I would not, because I view the social and educational facilities of the neighborhood as things of most importance. Of course, we must have crops, we must have the money before we can have these other things, but when we have money and have means, we should look first to the general uplift of those communities. That is the mission of the Farmers' Institute worker. He must help them get the money, help to show them how best to serve that community in a general uplift. That uplift is needed, but I want to tell you, it does not have to come from the city, but from among ourselves. The best governed man is the man governed from within, and this is true of communities. The finest and best educated community is a community educated largely from within. I want to tell you that the day must come when the farmers will no longer ship their young people away on trains and board them at our expense and depopulate the rural communities of young blood. We need to enliven our rural communities; we need more educational institutions in rural communities, and then we will have more homes and more life. There is an old adage which says that where there is life there is hope. I want to reverse that adage and put it the other way, that where there is hope there is life, where there is faith there is life, and we want to get the hopes of the farmer and rural population raised up a little higher, we want to get more faith in their occupation and get those good things around our farms and in our rural communities that our good friend last night thought we should take the family away in an automobile to reach them. I am not in for that sentiment; I want to bring that environment to the rural community that will make every neighborhood worth living in, that will make the farm of some value to us, so that it is not only a farm, not only a business enterprise, but in a true sense an intellectual and cultural center.

I have nothing to say of a complaining nature relative to the work of last winter. When we go home to our farms and delve into the work of the farm, the winter's work having passed, looking backward, it seems like the reverie of midnight dreams. We cannot recall all the little things. We have nothing serious to remember in last winter's work. We can see where we ourselves might have done better for the local people and sometimes I can see where the local people need in that locality a Moses to take hold of the upraising of the local work and lift it to a higher plane; and yet we don't understand, as strangers in a community, just what the encumbrances are in that neighborhood and may cast a shadow of doubt on the local management, when no doubt they are doing the very best they can under the circumstances. Mr. Chairman, I think I have occupied enough of your precious time and I shall leave the floor to other workers.

The CHAIRMAN: Now, my friends, you have listened to the discussion of the leaders of the Sections. This meeting is open for the man in the pew, now to see what he has to say about this matter. Two minutes, remember, though; some of you fellows are pretty long speakers.

MR. BLACK (Mercer county): I want to confess that it was I who shook my head at Prof. Menges when he said that we could raise things as cheap here as in York. We are up in the clouds 1,400 feet above the sea and we are 125 miles further north, at least, making 4 degrees difference. You have much longer summers in York than we have in Mercer county. It is the long winters that put us to sleep here; even the ground hog in Mercer county, after taking a little nap, goes back to sleep. If we had as long a summer as they have in York, possibly we would get wakened up to our opportunities. The Professor scolded us up in Mercer like blazes and I expect we needed a little of it, but he was a little too severe, coming from a different soil and climatic conditions altogether. He stated a moment ago that York could beat any other county in raising corn and he ought not to be so severe on us fellows that don't have quite the conditions he has in York county.

A Member: I would like to call up the question that the first speaker raised in regard to education in agriculture in our common schools. If any of them can put out a plan to secure that from a teacher, I would like them to do it.

The CHAIRMAN: Now, gentlemen, you have heard the question offered by the gentleman, of education in our common schools, referring to agriculture, I have no doubt. How can we get a plan by which we may secure that teacher in the country school who will develop agriculture in that school? You have asked a very important question. Does anyone want to answer that in two minutes?

A Member: Just one word; we have at the Pennsylvania State College a very charitable proposition, whereby they offer to give the teachers of Pennsylvania at almost a nominal expense, some training in teaching agriculture, and country school directors may do much to foster that by insisting that the teachers that they employ for the coming term or for the next year, shall take or shall have that training, and insist upon it. It is the cheapest part of the education of the teacher that they can get and the most needed by the country school teacher.

MR. STEVENS: In New York State they have helped to solve that problem by insisting that every district superintendent of schools shall pass a thorough examination in agriculture before he is eligible to hold his position.

MR. J. ALDUS HERR: It was my pleasure a few years ago to visit in Madison, Wisconsin, some of the Congressional agricultural schools of Dane county, a proposition which I brought before the members of our House from Lancaster county, was this: Why not draw up a bill and have it passed by the Legislature of Pennsylvania, creating a Congressional Agricultural School? Now, take Lancaster county, because I am more familiar with it, or take your own county of Washington, the City of Washington located nearly in the center of your county, take your Poor House Farm, which I believe you have one instituted, a school there,—your facilities to that farm from the county are fairly adequate; the people who want to go to school there, give them a thorough course in agriculture, let them take their course of study, and then the next period let them go out on the farm and put it into actual practice right there. You have not only the training of the mind, but the training of the hand with it. The way your farm is located, especially in Lancaster county, with our trolley system there, three-quarters of those pupils during the evening could go to their homes and not lose the influence of the parental home—they would not get away from that.

My theory has been, and I believe it is correct, the way to teach a thing is to do it. It was my pleasure last fall to visit the institution in Alabama, the colored school down at Tuskeegee, and the first motto

I saw on the wall when I entered the institution, was, "We learn by doing," There, I think, gentlemen, is the basis of our education. Teach them by doing.

The CHAIRMAN: Any other gentleman or lady—ladies, don't think we've undertaken to slight you at all—if you have anything to say, speak right out. We have some lady institute lecturers here and we want to hear from them. Mrs. Foulke, have you a word to say?

MRS. FOULKE: This is a subject that I have been very much interested in, and I have lately been in New York State and been interested in the agricultural movement in the high schools of that State. The State there has helped the schools; they pay one-half the salary. We have nothing here like it. They have an agricultural teacher in the high school that will guarantee twenty-five pupils, and those children are supposed to go out on the farm and do farm work, and part of their course is the work they do in their own homes. Their fathers and mothers or guardians can keep account of that and help to put them through, so that when they graduate they have so many counts of home work done. That will keep the children in the home and keep them interested in our farms. but that has State patronage that we don't seem to give much of in Pennsylvania. We are talking about it, but I am afraid some of you men will have to get busy with that, because we poor women can't vote, we can only nag you. You will have to do away with your small country school and combine your schools, so that children will come from far away districts and be brought in and taken back. It is worth while. It is a big question that I could not answer in the two minutes allotted to me.

PROF. SURFACE: I have for years been much interested in the subject of agriculture in the country schools, as a teacher, and now as a parent who has children in the public schools in the country. I feel that the teacher first should know the subject. We, as practical farmers, cannot do a thing that we don't know, and we cannot expect any person to do the things they don't know. We cannot expect a teacher to teach agriculture who does not know the subject. That teacher must be prepared. If a special appropriation is required, if special work is to be done, then there must be special compensation. It is unjust to the teacher to add to him the extra burden of preparing to teach an extra subject without compensating him for it. If we are growing some extra produce, we expect to be paid for it. If we are growing some extra produce, we expect to be paid for it, and when it comes to the subject of a proper compensation for the teacher who is prepared adequately to teach the subject, I concur in the necessity of consolidated country schools. The best schools in America are in the regions where they have them. In such places it is possible to have supervisors of agriculture to go from school to school and to help the teachers and see that the course is practically carried out and taught.

We are now coming rapidly to a system of county supervisors of agriculture in Pennsylvania, as I think you all know. It would seem that it might be possible for the county expert in agriculture to do a great deal of valuable service in the public schools of his own county, by acting as supervisor of agriculture and helping the teachers and getting them in a condition where they may stand on their own feet in teaching the subject, and they can get better assistance from the county superintendent of agriculture or county expert than any other source. They have other sources to which they can appeal. They can get the short term or special term at the College, or they can get information by writing for it, but they need that personal contact with the individual who can help them over their difficulties, and I believe we are producing the means of working out this important problem of agriculture in the public schools.

MR. BLYHOLDER: I am very much in favor of making agricultural education one of the chief cornerstones of our talks at our Institutes, and I am further in favor, very much, of a resolution that I had the honor of helping to adopt a year ago, the day after we met at Towanda. If I recall to memory, I had the honor of being one of your representatives at an educational meeting in Harrisburg, where many of the educators of this State had assembled, as well as from New York and Ohio, to discuss the matter of agriculture in our public schools. A resolution was there unanimously adopted, asking our Superintendent of Public Instruction to have his superintendents throughout the various counties of the State examine the teachers in agriculture, and I believe that that is the point to insist on, because, if the teachers know that they are to be examined in some subject as a branch, they are going to prepare themselves. And let us pass resolutions or go through the channel to go to those who are in authority, to demand that. We cannot wait until the public ask and demand it. If we had waited until the public demanded the public school system, we wouldn't have had it, and those of you who know the history of it, know that it had to be forced through our legislature when some who were its opponents were kept outside of the hall. So let us have the examination of the teachers, and then, when we have the teachers, a way will be provided. It seems to me that is the channel for us to work through, have the teachers prepared and demand it of them, and we will have it.

MR. GEORGE (of Indiana county): One thing I would like to mention, that one of the Section leaders spoke of in his talk, and that is the trailers that we sometimes have after us at our Institutes. In Indiana county last year we had no less than four at some of our meetings. Now, as the gentleman says, we get out among the farmers, we don't try to get into the large towns where they have hotels and good accommodations, but we get into small towns, so that the farmers will come, and we don't have very large hotels. We generally try to prepare accommodations before hand, unless Brother Seeds is along, and we sometimes have trouble getting places for him, but these agents that have been spoken of will come out after the last session and get across the country and get ahead of us and get the best room in the hotel, very often, representing themselves as members of our party, and when we get there, we find conditions rather unfavorable, and that is one of the reasons. As the gentleman said,these agents detract from the Institutes by buttonholing the men in the audience and keeping them out of the sessions and detracting in other ways.

Again, in our means of conveyance from one place to another, where we have a hack to take our men from one meeting to another, they will crowd in, and it makes our means of conveyance not very pleasant to us or to those that we are taking with us. While I hope that every farmer in the State and his family are reading some good agricultural paper, and I hope it may be put into every family, I do wish there were some other means of getting it into the family than by having these agents follow the Institute people around .

**MR. C. H. DEWITT:** I have very little to say, but I wish to say this: I am slow to find very much fault with those who are my superiors in office. Tioga county has been blessed with a good corps of instructors, and I want to say that publicly, and they have aided the people of Tioga county, who have availed themselves of the meetings held there; they have been instructed and the meetings have been very profitable to those who attended and to the instructors. I just wish to say to you, as one of the County Chairmen, go right on, regardless of any outside criticism. You are in the right and the right will prevail. The Secretary has no small job on his hands with you fellows to take care of, and I realize that, and if he does as well all over the State as he has done by Tioga county, we certainly are not going to find any fault with our Secretary.

In regard to the question of schools, our town of Mansfield has a State Normal School. Two traveling men were talking there last Sunday—they spent the Sunday in the town. I overheard them talking about the schools of Pennsylvania in comparison with the schools of New York State. They were both New York State men; I knew one of them, lived in Elmira, New York State. He said that the school system in Pennsylvania is in a higher state and in a better shape than the schools of New York State, that a person educated in the high schools and in the normal schools of the State of Pennsylvania is far superior to the scholars of people who are educated in the schools of New York State. Now gentlemen, with the fine appropriation that our Legislature gives us for our schools in this State, I should be, as one, loathe to find any fault with them.

Now one thing else occurred in the Institute, to our knowledge. We, of course, in and around Mansfield, have taken up, I think, eleven schools in the township and concentrated them in the village of Mansfield, which is a grand success, and when our lecturers were there last winter, they were invited to come there when I was not using them, in the hall, to come and talk to those children upon the different subjects that they were to talk upon in the Institute proper, and it was a grand success, and many of the children did, I hear, say on the street some of the things that were said to them by our lecturers. I wish to say to you lecturers, "Go along," and to the Secretary, "You are making a success of the Institute in the State."

**MR. STOUT** (of Schuylkill county): In relation to this matter of what have been called trailers after our Institutes, I don't see that there can be any reasonable objection to these people who represent newspapers going along with us and soliciting subscribers. The fact is, they are a very congenial and companionable set of people, very intelligent, sent out by these publishers, and they do a whole lot of good by getting these subscribers; sometimes I think they do more good than we do. They reach the farmers weekly and we go only once a year. They are a companionable class of people and I am willing to share my bed, if necessary, with those men who are sent out by these publishers, and just for their comfort.

**Mr. STEWART** (of Greene county): I want to endorse what has been said about these newspaper men. I don't care who comes behind, I am going to be before, and as the gentleman has said, these newspaper men cut across corners and get over to the boarding house and get the best place. There is no business for a County Chairman to permit that kind of thing. We can secure those places before the newspaper men come in and they've got to take what is left. Sometimes we are disappointed, but we have done everything we could to provide entertainment for those fellows before these newspaper men come. I want all the newspaper men to follow me that wish to, and if they interfere with the business of the Institute, I have the courage to tell them to wait till we get through and then prosecute their business. We want them to advertise everything we do. They are in sympathy with us, they are co-workers with us if they are earnest, and I believe most of them are. I invite our newspaper men to come out. The only trouble is, they don't come if it's cold weather and too far from the county seat. I believe our good friend is in the wrong in this respect in discouraging the men whom he calls trailers.

A Member: I just wanted to add a word to what Mr. Stewart has said. I have had the gentlemen from these agricultural papers follow Institutes in our county for the last eight years and I am just as proud of them when they are with me as I am of the lecturers. One or two of them are writers for some agricultural paper and they always write nice things about out Institute, which go before the public all over the State of Pennsylvania and elsewhere, and our Institutes have been boosted largely through that class of people. I invite them to our county and am glad to see them.

**DR. W. FRANK BECK**: I represent two classes of people: I am a member of the State Board of Agriculture and also a member of a large Chamber of Commerce. What are we going to do with the city farmer? Around Altoona, the farms are largely being absorbed by the city farmers. In the valley in which my farm is situated there is not one farm but what is owned by city people. In one county, 450 farms were sold to 50 people. Those people are moving on those farms. They are city farmers and they are a class of people who must be absorbed and recognized and reckoned with. The question before us is one of the most important questions—What are we going to do with the city farmer?

PROF. MENGES: I would like to introduce another subject here, that is the advertising of the Farmers' Institute.

The CHAIRMAN: Well now, these other fellows will introduce that for you a little later.

PROF. MENGES: Well, I wish they would.

The CHAIRMAN: Gentlemen, you will notice the program we have here, No. 2 on this program, "The Farmers' Institute, from County Chairmen's Point of View." There are six or eight of you here and a lot of delegates besides. Now comes the turn of the County Chairmen of Institutes.

MR. ANDERSON (of the Pennsylvania Farmer): I think a point that I wanted to bring up will come up very nicely under this subject of advertising the Farmers' Institutes, and I have been very much interested in the remarks that have been made here relative to the so-called trailers. Now that is right in our line of business. And we all feel that there is no legitimate objection to some of the methods that have been used, but I think more particularly to the fact that there have been so many newspaper men in the field, and I think that all of the newspaper publishers recognize the fact that the control of this feature is in the hands of the Institute men, and I am sure that if their numbers become so large that these agents become troublesome to you in any way, that you will find that the publishers will be more than glad to co-operate with you in any scort of a plan that will put us all on the same basis, and that is all we ask, and I am sure the publishers will all co-operate with you in that work. I was particularly pleased by what some of the gentlemen said and the very kindly way in which you were welcoming these men to your Institutes and the view you took of using them to advertise the Institutes.

Now, that is also our business and we are more than glad to have notes from county superintendents on the work of the Institutes and also glad to have notes from our agents. We instruct our agents to give us reports on the good, live meetings that are held in the different counties, so that we may get this work into our columns and give the news to our readers, and, as I say, this will probably come a little later in our discussion of advertising the Institutes, and Iam sure you will find all the publishers of the agricultural papers more than glad to help you all they can in tihs work and at the same time to regulate this question of the so-called trailers, if they prove troublesome to you in any way.

The CHAIRMAN (Director Martin): The Chairman will say one word: We have uniformly opened up the way for the agricultural press to visit with us at our Institutes. Within the last two years, the agricultural press have taken a more active interest in the Institutes and in presenting the claims of their papers, and I will heartily co-operate with the agricultural press of the State in making a proper allotment of Bureau of the Institutes, in which, probably, at no one meeting there shall appear more than two representatives of the press. Now, we can get along first-rate with two, but when half a dozen come and they form in line, just as some of these gentlemen have said, it does become a little annoying. We want to be frank about this. You are welcome, you have helped us in many ways, and you are one of the agencies in the uplift and upbuilding of agriculture, and far be it from the management of this Bureau of Institutes to say "no," but we feel encouraged when a representative of one of the leading agricultural papers has said what he has. I refer to the gentleman to my right, the representative of the Pennsylvania Farmer, and I have no doubt but what this question of representatives of the agricultural press can be adjusted to the full satisfaction of all concerned.

Now, if there is nothing further on this subject, we will take up No. 2, "The Farmers' Institute, from County Chairmen's Point of View." You will notice, gentlemen and friends, there are two or three angles to this thing. The County Chairman of Farmers' Institutes is the manager in the different counties. He has an immense amount of work to do. He has the advertising of these Institutes, selection of locations. Then he has to boss the speakers that are sent out, and that is a big job sometimes. And he is the fellow I want you to listen to a little while and see what he has to say about this matter. And I should explain that sometimes, you know, the "last shall be first and the first shall be last." You have heard that somewhere or other. Mr. J. Newton Glover has informed me that he has a call to go home this evening which cannot be well avoided, hence, we will begin at the last number with Mr. Glover, in order that he may be accommodated. His subject is, "Which is Preferable, Written or Oral Questions?" That is, shall we write the questions in the Institutes or just get up and ask those questions? Now, Mr. Glover, we will be pleased to hear from you.

## THE FARMERS' INSTITUTE, FROM COUNTY CHAIRMEN'S POINT OF VIEW

### 1. WHICH IS PREFERABLE, WRITTEN OR ORAL QUESTIONS

By J. NEWTON GLOVER, *Vicksburg, Pa.*

Generally speaking, written questions are preferred, as the Chairman usually has a period for written questions from the box, which he assigns to a suitable speaker to answer by giving all the facts he knows on the subject asked. But frequently a speaker makes a statement which is not fully understood or he does not go as far into detail on some point as someone in the audience wants him to go; then it is better to have an oral question right on the spot or at the close of the talk to further enlighten or answer the question which has occurred to the one in the audience, rather than have it written out and answered later, because this person may not be present at the next session when the written question could or would be answered.

Some persons will ask questions when they will not write them out, even on the tablets so kindly furnished by Hon. A. L. Martin. Where a poultry, fruit or a road session is held at an Institute, some persons will attend only the session discussing the questions which interest them and the oral questions give them the chance to get in close touch with the speaker, as the written question does not.

Then, oral questions bring out and answer many questions which benefit the entire audience and it saves the Institute speaker the extra work or effort in answering questions before and after sessions, which are asked by persons who would ask them in a meeting and help anyone who wants to know just what the speaker is trying to tell one person privately. So, on the whole, oral questions are preferable and do more good than written ones. Questions show how an audience is interested, so try to have as many good questions as possible.

The CHAIRMAN: The next will be, "County Organization of Institute Committee," by Hon. H. G. McGowan, of Geiger's Mills, Pa.

## 2. COUNTY ORGANIZATION OF INSTITUTE COMMITTEE

By HON. H. G. McGOWAN, *Geigers Mills Pa*

Mr. Chairman, Ladies and Gentlemen: Looking over the program, noticing that there are six succeeding speakers, if a point or two was thrown out by each speaker, a successful Institute could be managed, however inexperienced the manager might be. Any Institute will be an absolute failure unless there is a proper appointment of committees. The program, however, states "Committee." Now, as Institute Managers, we are all upon that equal footing so far as the time set apart by Act of Assembly for the appointment of places where Institutes are held, is concerned.

Now we must, in the appointment of these Committees, have a system. The operation of the great Pennsylvania Railroad would not be successful unless they had their great system. Our farm operations will not be successful unless we have a system. Therefore, my experience as an Institute manager has led me to establish just a little system in reference to the organization of Institute Committees. You all well know, as Managers, that the second Tuesday of June, at 1:30 in the afternoon at the county seat, is the time appointed for the selection of places for holding the Institutes. Now, prior to this time, I write to the secretaries of the various farm organizations in our county. We have two county agricultural societies, two granges, two farmers' unions. Therefore, this Board is composed, together with myself, of seven members, and they are always present; there is a reason for that, and I might say why. After writing to them, I prepare for their being present in this way: you know that the Act of Assembly allows them two dollars for attendance at that meeting. I don't have those men wait until I communicate with Brother Martin; I prepare myself with new, crisp two dollar bills right from the bank and as soon as we transact our business, I take the receipts of these gentlemen and give them the two dollars. That is a great incentive to have a good attendance at every annual meeting.

Now what I want to say is this: what we do at that meeting after we select the places for holding the Institutes is the appointment of a chairman of a local committee for every place selected. We discuss his ability in every way that our knowledge will permit; we select the very best man in his community. Now, that is the start; that gives the place where the Institute is to be held a little advertising. The man is proud to be selected as chairman; he begins to talk the Institute up; the matter is left at that point for a while, and no more is done, so far as I am concerned, until about eight weeks before the time of holding the Institute. I then communicate with this gentleman who was previously appointed as chairman of the local committee and have him call a special meeting to consider plans and make arrangements for holding the Farmers' Institute. He does, and there is where the balance of the committees are formed. We always have a good attendance at that meeting; it has never failed since I followed that plan out. We then augment this local committee and have possibly ten or twelve on the local committee. In addition to the local committee, we have, or appoint, an executive committee with this same gentleman as chairman of the executive committee. This committee consists of five persons. For what reason? For this reason, that they can call subsequent meetings and complete the arrangement of the program.

In addition to the executive committee we have a query committee. This is an important committee for this reason, that many an Institute lags on account of the failure upon the part of the audience to take part or be responsive. We select as chairman of this query committee a man who has had some little experience before audiences, who can pass down through the aisle gracefully and distribute the blanks sent us by Brother Martin, and who, before the audience, can stand up and read the questions. That's the query committee. And I want to say that because of the work of this query committee our Institutes have all been successful, as can be attested by Brother Watts and Brother Herr and others, which was due to the way the audiences responded, largely on account of the efficiency of this chairman of the query committee. We also have a committee on music; that is not so essential, but we appoint a committee on music of three or four or five and advertise this as a footnote upon our program: "The music of the Institute at Washington will be in charge of Prof. John Smith," or whoever he may be, and that ends that.

So, my friends, that is about what I have to say in reference to the appointment of committees and I think this is a plan that we can well follow out. It simply gives the Manager a chance to at once communicate with the chairmen of the local committees and then everything else will work out nicely, followed by energetic work on the part of the County Chairmen. Now, my friends, as Institute Managers, let us put our shoulders to the wheel and let us work with an impulse and a feeling that will bring about greater development along agricultural lines in this great Commonwealth of Pennsylvania.

The CHAIRMAN: The next subject is, "Responsibilities of County Chairmen;" and I want to say that there is no part of this great organization upon which there rests a greater responsibility that these very men who are appearing before you now, the men who have in their hands and within their power the practical control of this work in various counties. We had assigned upon this subject to Mr. P. S. Fenstermaker, of Allentown. But I am in receipt of a letter from him, giving good and sufficient reasons why he could not be here. I will explain, that previous to assigning Mr. Fenstermaker, I had requested Mr. J. Aldus Herr, of Lancaster county, who then was sick, but has recovered, and we will ask Mr. Herr to devote a few minutes of his time to this subject.

## 3. (a) RESPONSIBILITIES OF COUNTY CHAIRMEN

By J. ALDUS HERR, *Lancaster, Pa.*

Mr. Chairman, Ladies and Gentlemen: I am sorry on your account that Mr. Fenstermaker is not here. It would relieve me quite nicely if he were present at this tims.

In reference to the responsibilities of county chairman, if you have never filled that position, there is a little more responsibility connected with the position than you have any idea of. First, and the most responsible part of it, the person who takes the position as County Chairman should be, virtually, a first class farmer himself. He should put into practice what he hears and what he advocates and has advocated to his audience. Very little good indeed does the argument do to the audience and very little good does what they hear do, if the man who appears before the audience as County Chairman does not make his teachings effective in his own hunting ground; there isn't any doubt about that. We should give all due deference to scientific principles, but back of all that we must have practice. The man who takes the responsibility of County Chairman should have some compensation for the actual number of days put in. We know you will say he ought to do it for the good of the cause and as a matter of patriotism; but, gentlemen, just for that cause, some time ago I was confined to my bed for two months—patriotism—laboring for more than a dozen institutions, who piled up more work on me than I could do.

Now, gentlemen, if someone of the neighborhood is asked to be your county leader or County Chairman, if he were not of some value, he would not be asked to do it. If you don't think so, get some one else to do it. I don't say to pay any compensation, particularly, that amounts to much, but pay sufficient, so that I can hire some one in my place when I am not at home to perform my labor a few days. I don't ask for seven or eight or ten dollars, or anything of that kind, but the man who is engaged in active farming or any other business can ill afford to take that much time and devote it to things of that kind.

In arranging for the different committees, you have to be careful. You have to be careful in the selection of your locations, and one of the great troubles we have in a few of our meetings in our county is, we have a good deal of county pride and some of the people in our audiences wish occasionally to show themselves and crowd the State speaker aside and take possession of the meeting. The County Chairman must officiate and say: "Gentlemen, we have you with us all the time and we will take the State speakers now; the home talent we have with us all the time." There isn't any doubt about that, we have some struggle in that way. In reference to our numbers, our numbers are not as great in our county as five years ago, but the interest in the exhibits in our meetings is greater than ever. The man who is actually interested and wants to know will attend. The quality has improved, and if the people who are not interested do not attend, we don't need them. It is the man who is interested and takes an active part that we want.

It was moved and carried that the paper of Mr. P. S. Fenstermaker, on "Responsibilities of County Chairmen," be embodied in the proceedings.

Mr. Fenstermaker's paper is as follows:

## 3. (b) RESPONSIBILITIES OF COUNTY CHAIRMEN

By P. S. FENSTERMAKER, *Allentown, Pa.*

If the Farmers' Institutes to be held this coming winter are to be a success, the first, as well as one of the most important responsibilities of the County Chairman is that he sees, at the June meeting of the County Committee, that suitable places are selected for the holding of the Institutes.

No application for an Institute should be considered that is not easy of access by team, trolley or steam road by the agricultural people of a county. Also, that it does not necessitate speakers leaving a crowded, ill-ventilated hall at night, covered with perspiration and obliged to take a ten or twenty mile drive to the next place of meeting, in all kinds of weather. From what speakers have told the writer, that not infrequently, after arriving at destination, they are consigned to a room and bed with the temperature of a refrigerator, and were kept there until the next morning at 9 o'clock.

A County Chairman of any community that is obliged to put up with such accommodations certainly has the sympathy of the writer. In Lehigh county we demand places that are easy of access, warm bed-rooms and good food. We believe that Institute speakers are human beings same as ourselves. Farmers have long ago discovered that even the lowest of our domestic animals do their best when kept comfortable. Why not make things easy and pleasant for the noblest band of philanthropists under the sun, viz: the Farmers' Institute speakers.

The next responsibility, is the making of a suitable program with not more than two topics for a session, allowing plenty of time for questions and discussion. If the audience is slow or backward, the Chairman should endeavor to get the audience interested—to make them feel at home, and that it is their Institute. Once you get them thawed out, the success of the Institue is assured. A little music or short recitations once or twice during a session may be of some benefit to relieve the monotony. Topics by local speakers are not of much value except perhaps to take the place of a State speaker when absent.

The people of a community attend sessions to hear experts, men who have done things and who have a reputation in the various lines of agriculture, and not their neighbors, whose views are already well known. If you are, for various reasons, obliged to accommodate some of these embryo Henry Clays and Dan. Websters, place them on the Saturday evening sessions and thereby relieve the regular speakers, so they can leave during the afternoon session to visit their homes and commune with their better halves. They will be in better condition physically and mentally to again take up the work.

Next in order of the Chairman's responsibilities, is to see that the Institutes are well advertised. A good way to get your local newspapers interested is, occasionally, during the entire year, to give them agricultural matter for publication, so that when Institute time arrives, they will gladly publish all Institute news you may have for them.

And, last but not least, of the County Chairman's responsibilities is, that he should not shirk any of the duties connected with the position, but attend as many of the sessions as possible. If such County Chairman has already served a number of years, he will be known by many people, and a personal acquaintance with many of them will have been informed, so that they feel more at home in his presence than with a stranger, substitute, or a too-forward neighbor.

In fact, any person placed in the position of County Chairman of Farmers' Institutes and who conscientiously intends to assume its responsibilities, so as to "make good," as the saying is, must be "on the job."

The CHAIRMAN: The next subject will be responded to by a gentlemen who can boast of conducting Institutes at which there was a greater attendance, during the past two years, than in any other county in the State of Pennsylvania. I will tell you something about it. Last year, at a little town, known as Red Lion, there came to that Institute one delegation in a wagon loaded up with 132 people. They drove six miles with a six mule team and spent three days at that Institute before they went home. I take pleasure in introducing Mr. G. F. Barnes, of York county.

## 4. ADVERTISING: HOW BEST CONDUCTED

By G. F. BARNES, *Rossville, Pa.*

Mr. Chairman, Ladies and Gentlemen: I notice that Mr. Hutchison has a bouquet this morning and I suppose the Deputy Secretary intended to throw one at me.

The question of advertising Institutes is one which is of vital importance to every County Chairman in Pennsylvania. It is one that has appealed to me as being essential to the success of the Institutes. The method that I have used in York county has proven very satisfactory. First, I get in touch with the public press, and from the time the Institutes are located, which is, as you all know, the second Tuesday in June, I have the newspaper reporters keep the Farmers' Institute matter before the eyes of their readers continually, and it appears in their columns free of charge as an item of news, and they are only too glad to give us this advertising. They make a complete statement of the meetings, telling what the purposes of the meetings are and what subjects are to be discussed, all subjects pertaining to the advancement of agricultural interests. The first year I called on the editors of our county papers and explained to them the intention of advertising, how much it would be appreciated by their readers; and they immediately saw that it was to their advantage, as well as to the advantage of the farmer, and they gave us advertising and gave it free of charge.

When I have copies of the program ready to go to press, I usually give it to some little paper that probably only does job work or something of that kind; probably I have a little county paper or weekly paper do it; but the daily papers never get the printing of that program. I never do anything to create any jealousy between them. I send a copy of each of those programs, typewritten, to the editors of all the county papers. They copy this in the columns of their papers at least two or three times a week from that date on till within a week of the time the Institute convenes. At that time they place as one of the headlines, in rather large print, a heading suitable to attract the attention of every farmer in the county, and under that they print the complete program day after day on up till the morning of the Institute, when they drop all the programs, with the exception of the one for the two days following , and in that way they continue day after day, as our Institute progresses during the week or ten days that we have Institutes in our county.

After this is done, they send with us two of their reporters, reporters from each of the county daily papers, to write up the proceedings very extensively, and they not only do this at their own expense, but they also authorize these reporters to offer prizes for the best specimens of corn, potatoes or other commodities that have been actually grown on the farms in the county. This has aroused the business men of different places in sections where we held Institutes to such an extent, that last year, at the Farmers' Institute in York county we gave away prizes to the amount of over four hundred dollars, all of them being contributed without any expense to myself or the Department, as Mr. Martin knows. The public press is the best advertisement that I have met or have used in advertising Institutes in our county, from the fact that they reach more people than our posters or anything else can possibly reach. We have a number of posters sent out by the Department, which I also take to a local printer and have him insert the names of the lecturers, also their postoffice addresses and the date of the Institute at a certain point, and they are distributed within a radius of eight or ten miles of all sides of the place of holding the Institute, at least about twenty days prior to the Institute.

This is about the method we have been using. When I took charge of the Institutes about nine years ago, the total attendance in York county was 800. As Mr. Martin and Prof. Menges, as well, have referred to it, I think our attendance last year was in the neighborhood of 11,000. I do not attribute any of this to the actual work of myself; I really give the honors of this part of the work to the public press of our county; the York Gazette and the Daily have done more for Farmers' Institutes in York county than any other one individual would be able to do in twenty years.

This matter of advertising, some may say, sounds very nice when you talk from your point of view; but when worked out in our county we cannot get the editors to consent to do this without being paid for it. That may be true in some cases, but I would say to that County Chairman, "You go home and take your editor by the hand, sit down and talk the matter over with him, and on the second Tuesday of June, ask him to send a reporter to your meeting and follow that reporter back to that newspaper office and say, 'Now we have located the Institutes and your reporter has taken the notes and we ask you to do this as a matter of business both in the interest of the farmer and yourself.' "

We have had in our county the business men to come in to it and they have all agreed that the success of the farmer is the foundation of their prosperity, and they have come to the meeting the second Tuesday in June, demanding Institutes in places where almost everybody would be supposed to be connected with their manufacturing shops, and at one point, within a mile and a half of my home, we had an Institute last winter, the first for fifteen or sixteen years, that we had at the opening session in the neighborhood of six hundred people, and the majority of them were farmers and their families. Now, these business men requested this meeting from the fact that they felt an interest in the farmers and wanted better farming in the section where their factories were located, and at the opening session of the Red Lion Institute. which has been referred to—it was the winter before—and at the one this last winter we had over a thousand people at the opening of the first session. We had to secure a second hall and had both filled to the doors and were favored with the best weather during the two days we were there. I do not wish to take any more of your valuable time in this matter, but if you will try some of these little suggestions, I think they will work out very satisfactorily in your county. Other people tried it and they have come to me and told me, "We have tried to follow your advice and it works out very successfully in our county."

**The CHAIRMAN:** I have received word that at two o'cloack this afternoon's session will convene, when the Governor of the State, Senator Penrose, and, I am informed, a representative of the Good Roads Commission of the State will be present, and Mr. Jones, of "Dirt Road" fame will also be present, when the Good Roads Session will be held. You are all invited back at two o'clock for that session. Keep that in mind. Those who are not interested in this discussion may retire now, so that we may continue until twelve o'clock.

**The SECRETARY:** I only arose to ask you to make that announcement. Everybody who don't have to go will stay right here.

**A Member:** I am a newspaper man myself; we publish the Ohio Farmer, and I wish to emphasize the importance of the fact that people should not stop with the insertion of one advertisement, and I don't believe it is wise to confine the advertisement to one medium. I think Mr. Barnes has exactly the right idea in not confining his advertiseing to one medium, the newspapers, but also to use the poster. You have got to see an advertisement a number to times before you read it; somebody has figured it out that it takes seventeen looks. I don't believe it takes that many, but if you have these posters and have your program well published and print little stories from time to time about the people who are going to appear to make talks about what is going to happen, you cannot help stirring up interest in your Institute and having the interest; you are bound to have a good attendance and a good program, because a good attendance will stir up enthusiasm on the part of the speakers who are to appear.

The CHAIRMAN: Next on the program is, "Preparing Programs; When and How," by W. F. Biddle, Everett, Pa.

## 5. PREPARING PROGRAMS; WHEN AND HOW

By W. F. BIDDLE, *Everett, Pa.*

Mr. Chairman: Eight weeks prior to the time when my Institute convenes, I commence to prepare my program by writing to the Chairmen of the different local committees in the vicinity where my Institutes are to be held, and tell them to get together, see their neighbors, and arrange for the topics they want discussed in their immediate neighborhood. I give them about three weeks, so that they can get their thoughts well together and discuss the different topics they want that are applicable to the community in which they live, because they are better acquainted with that than I am, and then they report to me and I get the programs to the printers and they have to print them in a very artistic manner, if possible.

Last year, Mr. Martin will observe, if he remembers, the party that was to print the programs, their press broke down and they got a neighboring printer to print them, and I made a big objection; in fact, I didn't want to pay them for the programs at all. I like a little basket of flowers, or a few apples, or something like that on the programs. Brother Campbell can remember what looking things those were. I like something like that that will be artistic and I generally have them on my programs, and I have the Ladies' Session, and always try to have some ladies on the program, if we can arrange to do it; but in our county we cannot often get a lady to take part in the program; it is a hard thing to do. I don't believe that if we had woman's suffrage you could get any of the women in Bedford county to go out and vote, because they don't like to appear in public; but we generally have topics discussed there that are applicable to the home and to the farm, and the second night we have the Women's Session on the program, and I don't know, but sometimes believe that we ought to have a Boys' and Girls' Session, some time when we have our Institute. I believe it would be a good thing. I haven't tried it, but I don't know but what I will try it another year—have a Boys' and Girls' Session.

Now I don't know that I can add anything more to that, only, I have been thinking this winter of arranging my programs in a different way, the same as we did for our Fruit Growers' Association.

In our county, for the last two years, I have been arranging the program for that Association, and I only put the program of one session on one page; the balance of that page is devoted to notes for that session, so that each one that has a program has a notebook, and he can take the notes of that session down on that program. Now, I have been thinking of arranging my programs this year about two and one-half inches wide by four inches long. I can use one-third of that space for the program of that session, and the party that holds that program can take their notes and put them right down below that, and when the session is over, he can stick the program in his vest pocket or coat pocket and take it to his home in the evening and he has got that same notebook with him. I don't know but what that would be a very good plan in arranging programs, and I always then get my programs out of my people about two weeks before the Institute is to be held. I don't like to get them out too long in advance, because they will be thrown away and wasted; but I generally like to have my programs put in the papers, two insertions, two weeks prior to the Institute. I think that is all that I have to say on preparing programs.

MR. McGOWAN: I would like to ask, how many programs do you get out of the two days' Institute and what do they cost?

MR. BIDDLE: Well, under the present system, I have what we call a leaflet printed for our county. We had four days this last year. I hope Mr. Martin will give us eight next year; and I have about three or four hundred printed and they generally try to charge me about three or four dollars. That looks like a very small amount, but I think it is sufficient for us.

The CHAIRMAN: Next on the program is, "Local Institute Expenses," by Mr. J. E. Hildebrant, of Dallas, Pa.

## 6. LOCAL INSTITUTE EXPENSES

By J. E. HILDEBRANT, *Dallas, Pa.*

Mr. Chairman, Ladies and Gentlemen: In the matter of Institute expenses, as we County Chairmen all know, we have to do some missionary work in reference to it, and I think it is far better that we should, and there's lots of things we could pay for and some things we should, which, I think, would be detrimental to us in the interest of our Institute. We think we pay liberally for such things as we need and such things as we should. We do not wish to be burden bearers.

We start out with the rent. We try to get our Institutes in churches if we can. I think that is the proper place to hold an Institute; you get the respect of the people that come; the audiences behave better; some, that don't come for any good, will not come to churches. You have the minister with you; you have the music with you, which we used to have to pay for, and that one thing made our expenses run up years ago. We don't have to pay any more by having it in the church and in the Grange. We work through the church and through the Grange a good deal to get our help for the Institutes and keep down our expenses, and when we meet, the second Tuesday in June, anyone that is not willing to furnish a hall or church at a reasonable price, why, of course, we take it that they don't need an Institute.

In our county, we think we have a hard county, like Washington,—it's hard to get the people interested, because ours is in the anthracite coal region and our farms are scattered and so many of them have to go to market on certain days and their interest runs in different ways, and it makes your expenses greater to make a success of our Institute. We pay five dollars a day for either a church or a hall. We think the church should have the pay as well as the hall and we want to pay our expenses for the coal and lights.

A Member: Do you mean five dollars a day for the two days?

MR. HILDEBRANT: Five dollars for one day. We have six days of the Institute and that runs us thirty dollars and the janitor at one place was paid two dollars. We have the six days, as I have said; then we have our programs printed.

The matter of programs has just been before us, and here is a program we have printed. The gentleman said he would like to have something on it. Here we have the picture of a cow's head, and poultry, and cattle, and we have it amply large, so that on the other side you can take notes. It advertises the whole six days. For these we pay six to seven dollars a thousand. Of course, we pay for transportation from one place to the other. We don't go to the livery stable, because this is for the farmers, and if we can get a farmer that's got a good rig and team, he is the man we get and we pay him for it. He is entitled to pay for it, and this cost us, in our county last year, $11.50. My personal hotel expenses were $7.60 and my carfare traveling around to different parts of the county from one place to another—over 35 miles—was $2.70, and my postage and telegraph expenses were $1.13. Is there anything I have not covered of the expenses we should pay? That totals $61.20 or $10.20 a day, which, I think, is ample, and I don't see why we should spend more, and we get good results from it.

MR. SEEDS: I don't want to talk because I like to, but I would like to say a word because I think it is necessary.

The CHAIRMAN: Speak right out, Mr. Seeds.

MR. SEEDS: I know the County Chairmen of this State have all they can do, maybe, and do it for nothing, and they have treated me like a gentleman. As I travel over the State I have a warm heart for them, and I am not trying to find fault, because I don't like to, but last winter—talking about advertising the Farmers' Institutes—last winter I went to two towns; one of the towns I went to, I had the program in my suitcase and had the name of the hall where the Institute was to be held, and I didn't want to open the suitcase to get it out. I traveled up through that town and I could not find a man in there who could tell me where the Institute was to be held. At last I had to open my grip and take out the program and find the name of the hall where the Institute was being held. I did that last winter in two towns. I know that in a small town it is different, but in a town of six or seven thousand people, where business is conducted, you have got to do something to get the people to know it. The trouble in those towns was that the people didn't know the Institute was being held there. There ought to be some way of having the people know there is an Institute being held in that town.

Now, this is just one thing I don't think is altogether right, and maybe the County Chairmen have all they can do, but the people surely ought to know there is an Institute being held in the community. If you'd make a hobby out of it everybody would know it. A man never had a hobby in the world that everybody didn't know he had that hobby. A man one time was going to college and never made a speech that he didn't use Patrick Henry's address about "Give me liberty or give me death." He used it every time he made a speech and his college chums thought they would get him in a place where he couldn't use that assertion. So they got him in a debate in their college, on the question, "Resolved, that colic in the horse is incurable," and they put this fellow on the affirmative side and the debate started and he said to the judges, after he had presented his argument, "Colic in a horse is nothing more or less than confined air in the stomach, crying out, 'Give me liberty or give me death.' "

MR. HILDEBRANT: We don't advertise in our county, but we advertise in five of the county papers and we also have it posted all around. I don't think Mr. Seeds meant this for our county. And we tried to get the ladies interested and any lady or child can tell you where the Institute is held.

MR. JOEL A. HERR: Are we going to have further discussions on the same questions, or is this the sum total of it? If it is, I don't think the intention of this session is being carried out. We have had very little talk on some very important questions and this last question of the expenses of our County Institutes and the matter of managing them within the minimum rate of expense, is a very important question and ought to be further discussed.

The CHAIRMAN: Well, go ahead and discuss it, Brother Herr.

MR. JOEL A. HERR: I am glad to talk a little about it, but I want to tell you that sometimes our notions are entirely upset. We expected to do this this afternoon. In my grip I had my account and I would like to present it to the Institute, showing exactly how I keep my accounts. I have been keeping accounts for a good many years, and I have presided at as many Institutes in our county as any other member present, being a little older, unfortunately; but I want to tell you that the County Institute man, to start with, must be a representative man who knows the people and has an influence in the county in which he lives. If he hasn't, he'd better get out of the position and let somebody else have it. It is important on account of the influence he has in securing places to meet, in securing people to work, the respect he commands and the confidence that the people have in his honesty and integrity and the ability he has got to handle the audience.

I believe, in this important matter of expense, it is well to establish a sort of precedent; for instance, don't give more than a certain amount for the use of a hall. If a party comes to me and says, "We want the Institute in our community, but we cannot get a hall for less than ten dollars," or, perhaps, "We can't get a hall for less than twenty dollars," I will say, "You don't want it very bad; we will hold the Institute if you say so, but we will give you five dollars for the hall and if you like the Institute well enough, you can pay the other fifteen." Generally we have it in a church, but we give them to understand that, "We are bringing that Institute to you entirely clear of expense; you are not expected to board us or lodge us or anything else. It is entirely free and money in your pocket. If you cannot afford to furnish a place to meet in, we will go where they can." There's always lot of places waiting with churches that are not too expensive. If you establish a precedent and say, "I am going to give this church twenty dollars," the very next church will say, "We are just as good and need it just as much as that church and we want twenty dollars."

We cannot afford to do it. I want to say to you that I conducted last year six day Institutes in our county. I had livery hire, and we paid all our expenses and instead of getting $75, we only put in a bill of $47 or $48; that was all we needed. We had good Institutes, successful Institutes, and all our expenses were met. I believe in a little management in advence. We can largely curtail our expenses and have more attendance. I guarantee that if Mr. Martin will allow the State speaker to stay in my county for eight days, I will take the six-day allowance he gives me and hold the Institute for eight days and pay all the expenses. It can be done, but it has to be done by some thoughtfulness, some influence and some action all over the county—your influence with the strongest people and people of the neighborhood; if you get them interested in it. That is only one feature of the Chairman's work.

The Chairman's work is very important. There are a great many new Chairmen and some, perhaps, never prepared programs. It is very important that we have programs properly prepared and everything done in order and I think half an hour could be profitably spent in comparing experiences in that line.

MRS. FOULKE: I suffered a litle bit from going to towns where the Institute has not been properly advertised. In the first place, you put the poster on and it won't stay up; they are not up twenty-four hours after they are posted; they are not put up in a properly protected place. I have seen numbers that were turned down, just hanging. Then they ought to be of a more attractive design. I know a little about that, because I have advertised and worked up all sorts of things for my home County hospital. I have been on the board there and so I have been interested in county work and we advertise that largely. Your posters are not catchy; people won't read them; it may be a tax advertisement and we all avoid those,—we don't see them if we don't have to. The posters are ordinary posters and nobody reads them unless they are specially interested in them. It seems to me it would be a good idea if the County Chairmen, before they locate their Institutes, would find out whether the people wanted them. I have been to some places where we were not wanted. I know that we were not wanted, because the people didn't come. If you are advertised by your loving friends they would get up and talk about it. If the County Chairmen would find out where we are wanted, then we would be already advertised, and I think the programs ought to be more interesting. They are very stupid, as a general rule,—just a list of names and what we are going to talk about. They might be quite business-like and very much more interesting.

A Member: Mr. Herr stated that he thought five dollars was enough for the use of a church. A church is a particular home for particular people and they have to bear all the expense for the maintenance of that church. The whole countryside will gather there and whatever wear and tear is connected with it must be borne by the particular people of that church. I do not believe that five dollars is enough to reimburse that particular church organization for the use of their building by the whole community.

MR. JOEL A. HERR: We are not going to pay for the church, we don't propose to. We are not here to contribute to a church, we are here to pay for the light and fuel we consume, so we don't leave you any poorer than we found you. If you want to contribute to a church, do it, give them just as much as you want to, the opportunity is open to you. We furnish the entertainment and that will entertain you sufficiently to pay for the use of your church.

The CHAIRMAN: We have one more subject on this program, "Should County Chairmen Attend all Their Institutes?" by Mr. J. H. Schultz, of Norristown, Pa. Mr. Schultz will please come forward.

## 7. SHOULD COUNTY CHAIRMEN ATTEND ALL THEIR INSTITUTES

By J. H. SCHULTZ, *Norristown, Pa.*

Mr. Chairman, Ladies and Gentlemen: It is a hard matter to talk to hungry people and it is very discouraging to talk to a half filled hall. But I have some things to say and I want to say them in a few words and be done with it, and then we will all go and eat.

The subject as asigned to me is, "Should County Chairmen Preside at the Farmers' Institutes?" I was surprised when Mr. Martin informed me that I was to talk on that subject. I took it for granted that every County Chairman presided at the County meeting, but I believe such it not the fact. I believe most positively that he ought to and if he is not competent to preside at the meeting, he isn't fit to hold the position and somebody else ought to be appointed, because I believe that the County Chairman holds the same position over his county that the successful farmer does over his farm. The County Chairman ought to be acquainted with the conditions in his county, he ought to know the workings of his people and those things ought to be strengthened, and unless he is in touch with his people, how can he hold a successful Institute?

What a successful farmer wants to do is to make the poorest part of his farm as productive as the richest part of it, and that is the successful farmer. That is what we are attempting to do. If Montgomery county wants to raise more corn than anything else, if our farmers have their corn cribs full of corn, they don't need to care much about the high cost of living, they can make money. But in order to do that, in order to get them interested more and enable them to raise more corn and better corn, I get out a paper to offer prizes at the different Institutes. And right there is a point I was tempted a bit ago to take up when you were talking about those trailers. I made use of those trailers, the newspaper men, if you please. They came to our first Institute, and as the people came in the hall and sat down before the meeting opened, they got to talking, neighbor to neighbor, in a social way, and those men came in, they thought their business was the most important, and they just stopped those people from their conversation with each other and thought that they had to sell them a paper right then and there. I was surprised. I stepped up and just told them where I thought their place was and they took it good naturedly and we had no trouble, and afterwards I went to them— we offered prizes, as I told you, for corn exhibits, corn prizes,—and got them to offer their newspapers for the third, fourth or fifth prize, and then the competition came in between the newspaper men. For instance, one man offered free subscription for the fourth or fifth prize; the next man thought he would get ahead of that fellow and offered two subscriptions for the sixth prize, and so we had them going. They didn't annoy us. We simply told them where we thought their place was. I don't think it is a bad thing to have them, but the Chairman ought to be boss of the proposition and certainly ought to preside. There is no question about it. The Chairman ought to know the workings of his people, and if he is Chairman, he can control their discussion and bring the weak points out that a farmer needs so badly, and those are generally the points that a farmer is not concerned about.

The trouble with our people is, and with the farmer as a whole is, that he is contented, satisfied with his condition. That is the most pitiable condition a man can get in. I want a man to be dissatisfied and want to do better than ever before, and unless you get that condition you will never improve, and the County Chairman can see exactly in what points the farmer is lacking and the County Chairman ought to be a practical farmer himself; there is no question about that; if he isn't, he cannot be a successful man in his position.

SECRETARY CRITCHFIELD: Just in a word, I want to say, I agree with pretty nearly all that was said by the gentleman who has just left the floor, and yet we must all remember, there are some very good business men, some good organizers ,men who can do the work of the County Manager, who will not make very good presiding officers. There are some men who will lose their heads as soon as they get into the chair and in cases of that kind I think it would be better if the County manager would select the very best man he can for Chairman and let him preside.

To illustrate, some years ago, at one of the Institutes, I will not name the county, but it was in the western part of the State,—the Chairman was just the kind of a man I am speaking of, a man who was competent, a man who could arrange a program, but when he got up before the people, occupying the Chair, he would lose his head and he made a statement of this kind: He said: "The next performance will be, Mr. Herr will speak a piece from Clinton county."

MR. SCHULTZ: I think I must tell you my experience this year at one of my Institutes, and I think that will strengthen my argument, but the point is this, if a Chairman does not preside at his meetings, he may possibly not be at the meeting at all and he may get just a little bit careless. What would have happened at one of my meetings this year if I had not been there and known I was within my rights and was boss of the job? Possibly this is not to the credit of Montgomery county, I don't think it is.

The CHAIRMAN: Montgomery county is all right.

MR. SCHULTZ: I believe we had the most successful Institute ever held in Montgomery county, this year; but for what happened at one of our meetings—it was at Salfordville. We opened the meeting Saturday afternoon at 1:30 and one of the speakers was on the platform and talking on poultry, and a man came in and he was none too steady. He was a hotel proprietor from a neighboring town and he came there with the purpose to get the Institute at his place next year, but he was intoxicated and came in the audience and sat about half way back in the hall and wanted to talk to everybody around him and reached over and touched the ladies and made remarks about the speaker and all that, and the speaker's talk didn't do any good. A farmer asked a question and he chipped in. The hotel man at the place where the Institute was held was in the audience, too, the proprietor of the hotel, and I went right down to him and says, "This is no credit to you; you get that man out of this audience." He raised his hand and says, "I'm afraid of that man; he's a beast, you don't know him." I didn't know what to do. I went back on the platform and there was the Chairman of the local meeting and I told him to go down and get that man out, or this meeting can't go on. Says he, "I live near that man's home and I would be afraid to go to Schwenksville if I did that, he'd shoot me." Then I went to the Squire and I told him, "Squire, this is a local proposition, this is up to you, you get this man out. You are the proper man." "Oh," he said, "in the position I hold I wouldn't care to do it." He was on the floor talking and I told him to take a seat and then I got up and told the audience that unless we could have order at once I would adjourn the meeting right then and there. Of course, I made the remark about this man disturbing it and he jumped up and talked till everything was blue; he swore—well, I don't think I ever heard a man swear worse than he did, and worked himself into such a rage that he went right out of the room, but before he went out he turned and gave me another shot. But suppose there would have been a man that didn't feel that he was positive about his position; would he have taken those steps? I doubt it.

The SECRETARY: Well, Mr. Chairman, I think that the positiveness of the Chairman about his position was due to the fact that they are not all as big as Mr. Schultz.

A Member: If I had been there I'd have thrown him out head over heels.

PROF. MENGES: Just a minute in regard to this matter of advertising; I am not satisfied with that part of the discussion here this morning. I have had some experience—

The CHAIRMAN: Just wait a moment till I say something. You see we have placed here General Discussion to follow this Session. Now, we are all interested in this. Wouldn't it be well if we should adjourn now and get our dinner, and before the Night Session, or even before the Afternoon Session, come back here and have a general discussion?

MR. HUTCHISON: I move that we adjourn till half past one; that will give us half an hour before the other Session.

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Washington, Pa., May 22, 1913, 1.30 P. M.

Director Martin in the Chair.

The CHAIRMAN: The question of pay for the County Chairmen is one of the most important subjects we are considering, and I should be pleased to have a free and open expression from the different County Chairmen as to their desire upon that point, for my action will be governed by the reasonableness of their desire.

MR. WOODSIDE: I have to hire a man to do my work while I am away, but the State is not allowed to grant us anything for that expense; and while I receive some benefit from it, I, for one, feel that we should be paid for our time so that we are not at a loss financially when we are away from home.

MR. SHUEY: I said something on this question last year and I will say it again, as this man behind me has remarked, that it is always a loss to every County Chairman, the time he loses and not getting anything for it. But as far as that goes, if the Agricultural Department hasn't provision enough to pay the County Chairmen, I would not ask for it to hinder the work of the Department. I am always in favor of making improvements, and if this should be in the way of agriculture to make advancement, I would say, keep on this way. But if the way is clear, I should say, give the County Chairmen a small pay for their services.

MR. CRITTENDEN: I would like to ask this question: Does anyone in any way connected with the Institute force, work without pay, except the County Chairman?

The CHAIRMAN: I know of no one who works without pay except the County Chairman and his Committees. I know of no set of men who perform a greater amount of disinterested labor for the cause of agriculture than these men, yet I am not clear that we would engage better services were these ment to be dropped from the work, and some fellow that wanted two or three dollars a day taken up. I want you to think about that. What do you think about it? What is your reasoning on this subject? **Sometimes we are** led to believe that the school directors of Pennsylvania perform a great, disinterested work for education without pay, and it does not seem exactly just; neither does this. You gentlemen who are interested, discuss that point and come to some conclusion. Whatever your conclusion, it will meet with my hearty approval.

A Member: I am willing to put in my time and work along these lines, but I don't like to do it at a loss.

SECRETARY CRITCHFIELD: In further answer to the question of the gentleman over there, I would like to say that the members of the State Board of Agriculture perform the services that they undertake for the State out of patriotic motives entirely; they do their work without any pay; their expenses are paid and that is all. They attend the regular meetings of the State Board. Some of them are appointed on committees that require them to spend a good deal of time in collecting data for the reports they must make, and those reports constitute a very important part of our agricultural literature. Whatever these men are doing in connection with the Institute and in connection with the work that is being carried forward in the interest of agriculture in the State, is done without pay, except that their expenses are paid.

MR. BOND: For more than ten years after the first Institute was established in Pennsylvania, the entire force rendered all their services for nothing. My friend Critchfield and I traveled clear across this State for nothing but our actual expenses, year after year, and a number of others have done the same thing. We were not able to give the service these scientific men can give now, but we gave the best there was then. People expected it and our Institutes have grown from that foundation.

MR. J. M. DERR: I have been associated with school work and school directors for a period of twenty-four or twenty-five years, and we run across school directors that think they ought to be paid for their services. I am of the opinion that as long as we can have school directors to serve without pay, we will probably have a better class of directors than those who receive compensation. I also feel that as long as we can get County Chairmen to work without pay, we will have a better class of County Chairmen than if they receive compensation for it. I feel as though the County Chairman ought to serve without pay.

MR. G. F. BARNES: I suppose there's but one or two counties in Pennsylvania where the Chairman spends more of his time away from his home and business at Institutes than I do. In our county we have a number of Institutes and it takes some time. I have never begrudged a minute of the time I spent attending the Farmers' Institutes in our county. It has been profitable to me, even if I did pay a man a fair per diem pay for rendering the services in my home while I was absent; and just as soon as you put a per diem pay on the Chairmen of the Farmers' Institutes of Pennsylvania, just so soon will you cripple the interests of agriculture and bring about a class of men, no doubt, that take little interest in matters of agriculture and serve as Chairmen from the fact that they have been designated as Chairmen and are drawing the per diem pay for their services. I, for one, am willing to contribute my time in the future as in the past, and I think we ought to be willing to accept the same proposition.

MR. BOND: You don't want a dollar mark stamped on you.

MR. STEWART: I have just learned what the question is under discussion. If I understand it, the question is whether or not we County Chairmen should receive compensation for our time devoted to this work. I want to say to you that I would not accept any compensation if you'd give it to me, because I am convinced of the fact that my work, my influence, my power, would be weakened. I want to tell you that I believe it is more honor these days for a man to serve his fellow-men, particularly his fellow-farmers, without compensation, than it is for the highest paid officer in the State of Pennsylvania, who gets the largest salary and does the least service. I do think that a good rule in Pennsylvania would be, less salary for services and more stars in a man's crown.

The CHAIRMAN: Any other gentleman: Any other subject that you desire to discuss? You will remember, gentlemen, that we were discussing a great many uestions this forenoon very hurriedly and we have this little time to expend. I might read the questions presented in this program to stimulate your thoughts just a little: "County Organization of Institutė Committees," "Responsibilities of County Chairmen," "Advertising; How Best Conducted," "Preparing Programs; When and How," "Local Institute Expenses," "Should County Chairmen Attend All Their Institutes?" "Which is Preferable, Written or Oral Questions?" These are the questions we were discussing this forenoon.

MR. BLYHOLDER: The question of attending the Institutes, I would say, has not been very much touched upon, and it has been hinted here that some of the County Chairmen arrange with their local committee to select the chairman. Now I have been for fifteen years occupying the position. It was my practice for a number of years to select local chairmen, but my experience led me to this, that if I could not fill that position as well or better with the experience that I had, and ought to know the needs of the various communities and of the farmers, I ought certainly to be able to fill that position better than the one selected from the college who had no experience. I say that a Chairman who has had several years of experience ought to know, when he faces his audience as the first speaker, how to direct that Institute to make a success. Therefore, Mr. Chairman, the County Chairman, if it is possible, should attend every meeting of the Institute in his county.

And now as to the responsibility that has caused more thought in my mind as to my duty than any other part of the question. When we attend these Institute meetings, like this one, which is the round-up, we are warned of the greatness of our profession as farmers and the responsibilities that rest upon us as citizens—as farmers and citizens—the responsibilities that rest upon us because of the rising generation. We are told that upon the children of the farmer depends the future of this country and I believe it. Therefore, I say, Mr. Chairman, that the responsibility that rests upon the County Chairman is a great responsibility, because upon him rests the responsibility of directing the speeches and the thoughts and lines that are to be presented to the rising generation in his district, and a man that has a responsibility like that ought to be studied by every Chairman, because his fitness has a great deal to do with his success. I have been at Institutes, Mr. Chairman, where the thoughts of the children, I think, have been drawn from the proper channels and not in the direction they should have been, so that I say, the responsibility that rests upon the Chairman of guiding the future is a great one and a question that ought to be discussed here more liberally than it is.

The CHAIRMAN: We have about ten minutes yet.

PROF. MENGES: I referred this morning to the advertising of Institutes. I don't think that that matter has been discussed as fully as it should have been. I know very well that I haven't time to discuss it, but I would suggest that the Chair appoint a Committee of County Chairmen to work out a plan of advertising the County Institutes so that the farmer may know when and where they are held, what subjects will be discussed, who the speakers are and what the Institute is intended to do. I say I believe it would be a good plan to work out a method of advertising these Institutes thoroughly. Mr. Seeds said this morning that he got into a town some time ago and nobody knew that there was an Institute to be held there, and I have had similar experiences, and I believe there are other men here who could verify what I have said.

MR. SHUEY: As soon as you get into the larger towns, the people don't bother themselves. If you have it advertised in all the papers, they don't look at it, and when you ask them, they don't know anything about the Farmers' Institute. What's the reason? Those men go to the wrong people to inquire. If you go outside the large towns and in the little towns, everybody knows where the Institute is to be held. In regard to advertising, I found out in our county that some of our local chairmen had an idea that we should get postal cards and send a card to every individual farmer to get them all there, but I find that we won't get any more there that way than we do by putting up posters and advertising the whole program in the paper. In some places it may be all right to notify every person by postal card, individually, but it didn't do in Lebanon county.

MR. BLACK (of Westmoreland county): I am one of the has-been superintendents of divisions. I am out now, but I want to state a fact that has taken place in our county and that is this: We came to the conclusion, after talking the matter all over as to the best method of advertising the Institute, to get the people to all know it, and we spent a few dollars in some printing, and every member of the Committee suggested certain farmers all over the community, they know them all, they knew all the farmers in the community, and those were the people we were after. We sent each one a copy of the program, names and everything connected with it, and, my friend, it would be surprising to find out the number of people that came in and attended the Institute. They all knew about it, and to this day, Mr. Chairman. I want to tell you that there has not been an Institute held in our county that the attendance is to great as that. They all come in; they all seem to know about it. As to advertising it in the local papers. that is all right, it is all very true, but you would be surprised to find out the number of people that don't read even the local papers at all. Send a notice direct to them and you will get them all interested and they will all be there.

MR. KESTER (of Clearfield county): I want to emphasize the fact that the program is the best advertisement of the Institute; and yet I should say, on an estimate, that one-half the places where the Institute is held in the State, the programs are opened for the first time in the first session of the Institute. I believe in their general distribution through the public schools and otherwise throughout the community.

MR. M. M. NAGINEY: It has been the custom in my county to distribute the programs a short time after they were printed, send them all over the county and to public school buildings and also send postal cards.

The SECRETARY: I would like to suggest that in connection with the programs being sent out in advance, which I regard as a very excellent method of advertising, it is a good thing to have some of the local people in every community where the Institute is to be held, on the program. Great care must be taken by the Institute Manager to get the right people. He ought to get over into that neighborhood. My own method, when I conduct the Institutes in the county from which I come, was to call a meeting of the people in the community where the Institute was to be held, in advance, and then talk the matter over with them and have them appoint their committee, and one of the duties of the committee was to suggest persons from that neighborhood who were to take a place on the program. If you send out your program in advance and have named several persons of the immediate community in which the Institute is to be held, as persons who are to take part in the discussions, who have a place on the program, their neighbors will be anxious to hear what they have to say. Mr. Smith will say, "I am going to the Institute because I want to know what Brown is going to say on the subject that is assigned to him." In some instances they will think that the wrong fellow has been put on the program and they would have been able to do that matter much better themselves and will come many times out of curiosity, but what you want to do is to get the people there.

My own thought is, that one of the effective means that can be employed in getting the people there is to have some of their own neighbors on the program. I had charge of the first Institute that was held in my county and I was pretty well acquainted with the people of the county, having been County Superintendent some years before that, and I made it a point to go out into the different sections of the county and select farmers and farmers' wives who were teachers years before when I was County Superintendent, and get them to take a place on the program, and I sent the program out in advance, and some of the men who are living today, who, as Mr. Bond has said, come way across the State without anything except their expenses, feel that if the Institute shall not be like a bumble bee, largest at its birth, we are certainly going to have a very great success with Institute work in our county. We had a full meeting. We had the large court house and there was a pretty long standing room, and I think the reason was because the program was largely made up of our own people in dicerent sections of the county.

The CHAIRMAN: The only other thing we can do is to draft a system, to be presented to our next meeting, of the best method of advertising the Farmers' Institute.

(It was moved and carried that such a system be drawn up and presented).

The CHAIRMAN: We will take that under consideration and have that committee appointed. If the audience will be patient, the Good Roads Session will commence within a very few minutes.

(Governor Tener, Senator Penrose and others then arrived and Mr. G. G. Hutchison took the Chair).

## GOOD ROADS SESSION

Mr. G. G. Hutchison, Chairman.

The CHAIRMAN: My friends, you will please give attention and we will begin the afternoon session. It is not often that a farmer is called upon to preside over a meeting with gentlemen as distinguished and well and widely known as we have here this afternoon. It is not often that one is called upon to introduce so many distinguished men of our State and Nation; but I will ask your forbearance and I will try and do the best I can.

The first gentleman I have the honor to introduce to you to-day is a native of your own county, born in County Tyrone, Ireland, who came to this country with his parents and commenced to hew out life in America. I tell you what it is, my friends, it must be a matter of pride to any man that starts as a worker in a mill, as a clerk in an office, and following that, as a baseball player, and going from that to Congress, and then in a banking institution, then going out from you to become Governor of this Commonwealth.

One thing I can say, that the first thing he did was to get acquainted with this great State, and especially with the agricultural interests of the State. I remember well when he first visited State College, the place of the meeting, the foundation of our educational interests in agriculture, and how he stood up for that College and placed us to-day in the front rank. He has never turned his back on the Department of Agriculture, nor on any bill that came up that was for the interests of agriculture; but the great subject that lies near his heart and his mind was that of building a road system over this great State of ours.

And he has begun, and he is working with might and main, though no man has ever started on any big enterprise but has been criticised, yet he is here as a man to stand on his feet and meet any criticism, and the day will come, after he has retired to private life, when his name will be blessed from one end of this Commonwealth to the other for founding a road system that is not excelled by that of any of the Commonwealths of the United States. (Applause) It is with great pleasure that I present to you your fellow citizen, your neighbor, your friend, Governor Tener, who will now address you. (Applause).

## ADDRESS OF GOVERNOR TENER

Mr. Chairman, Ladies and Gentlemen and my Fellow Citizens: To be invited even to be present at such a gathering as this, held on the part of the Commonwealth of Pennsylvania, would indeed be an honor; but I deem it a special privilege and the greatest pleasure to come here into my own county and meet with you this afternoon.

I realize that many speakers, nearly all of them, if they can, endeavor to connect themselves with whatever movement your meeting has for its purpose, and I would like to say to you, in truth, that I ever was a farmer or that I am a farmer. The fact is that I have never been a farmer and am not a farmer to-day; and yet, coming and going about our great Commonwealth, from Wayne to Greene and from Erie to Delaware counties, I can appreciate, I think, as much as anyone, though they be farmers, the importance of the great agricultural interests of this splendid Commonwealth of ours. And so as early as the Convention did me the honor to give me the nomination for Chief Executive of this State, I asked just one thing, that just one thing be put into our platform and that adhered to, and that was, a commitment for a State wide road improvement, a system that would connect all our county seats in one great comprehensive system; that those roads, so to be built, should be built and ever after maintained by the State. To that end this administration has labored and has not been laboring in vain.

I presume in your meetings up to this moment you have talked of roads as well as other subjects of special interest to the rural communities, to the agricultural interests, and perhaps some of the things I may say now are only a repetition of what has been said and perhaps better said. But you all know that in Pennsylvania our aggregate mileage of all kinds of roads is some 90,000 miles; that under the provisions of the Sproul Bill, the State commits itself to the taking over and to the care and maintenance, and finally, to the complete improvement of some 8,000 miles of that 90,000. I wish it were possible that we could commit ourselves at once to the taking over and to the complete improvement of every inch of road in Pennsylvania to be built and maintained by the State; but you realize how impossible that is, how long it takes to organize, and also, that we cannot, from the ordinary revenues of the State, get sufficient money to complete such a system at as early a date as we would like, so that those of us living to-day, might have the advantage of this great improvement.

And yet, in approaching so important an improvement as that of our great roads, so important a question, we must do it carefully, conservatively and consistently, and so as we would improve the great rivers, as the United States has committed itself to the improvement and to the canalization of the Ohio River from Pittsburg to Cairo, to a depth of nine feet, so that that great stream may be navigable every day and every month of the year, sufficient money only is appropriated from year to year for that purpose that can be judiciously used, that is to meet the estimate of the engineers for that year's work, depending upon their organization first. And so in the organization of our State Highways Department, it will be absolutely foolish to give them the control of a great fund of money, a great amount of money, fifty million dollars, as is contemplated as the final and aggregate sum, because they could not use it at this time it; would not be the part of wisdom or business to do so, and, therefore, it has been advocated, and while this administration probably will neither recommend nor direct the expenditure of one penny of the proceeds of the proposed bond issue, if that issue is favorably considered by the people, I believe that only such amount should be appropriated from year to year as could be judiciously expended by the Department, and that those roads should be built where they are most needed.

Now the Department is working to that end. Before the organization of the present Highway Department, in all the years up to this time or up until a year and a half ago, Pennsylvania could boast of but seven or eight hundred miles of complete, improved highways. Since that time some two hundred miles have been completed and there is under contract to-day very many miles of such construction.

The great question, now that we have the automobile, is just the kind of a road to construct. We must consider the character of the country through which we pass, we must consider the grades, we must consider the traffic. And yet while some say we should not appropriate or spend a large amount of money at this time, because we don't know that perfect type of road, I do believe the time has come when we can say that we can build such a road to-day as is practically everlasting. On our easy grades, on our level roads, we are putting in to-day ,the State is building the concrete, solid concrete base road with the curb joining that concrete and enclosing on the surface a two-inch mat of asphalt and stone, so mixed as to give a perfect bond for all time to come, a perfect and easy bond, easy for the tread of horses, and in every respect considered the perfect road. Where the traffic is heavy and where the burden of the vehicle is especially heavy, we construct brick roads. In the isolated districts, where the macadam road will serve just as well, that sort of a road is constructed, and so to-day, in cost of roads, we have them varying from three thousand dollars per mile to sixteen thousand dollars per mile. That is to be the system, I hope, and that is to be the undertaking and the method of undertaking that will be pursued in this great advance movement.

Now the question of good roads interests not only the agricultural districts, but the centers of population as well; because in these days of easy travel we find our people going from place to place continuously. And in regard to the farm life, the fact that our roads are built, making visitations, making travel easy and our court centers and county seats more easily accessible, we find that life in the country is much more pleasant and the neighbors see each other more often and that there is a greater sociability and a greater happiness among all our people.

The agricultural interests and agricultural questions which you are here, no doubt, especially to discuss among yourselves, are always and ever will be the most important, not only in this Commonwealth but in all the Commonwealths of our entire country, and Pennsylvania is not behind in all that it commits itself to do for that interest. We read a great deal about Pennsylvania in our papers, and sometimes we criticise, we criticise honest men who are doing their duty, endeavoring to do their duty in high office, and we hear of the great things of other states, and while we may criticise at home here, there is not one among you who does not defend Pennsylvania, her institutions and her honor, when you happen to be in any other state. (Applause) And I am sure, your own State, your native State, this great State of yours, is your greatest pride. Now, while much might be said all the afternoon, the minutes and hours of the afternoon might well be consumed in talking of Pennsylvania, I do not propose to do so. The Senior Senator is here, and I ask for him and for his subject and for your own benefit, your very close attention to the financial scheme which has been suggested for Federal aid to post roads. That is becoming one of the most important subjects before us to-day, supremely important to Pennsylvania because of our area, because of our population and because of our great assessed value. Under that scheme, Pennsylvania would be entitled to a very large amount of the funds available and to be provided by the Government's credit.

I want at this time to again express my great delight for the pleasure and the privilege of not only speaking to you, but of meeting you here face to face in my own county. (Applause).

The CHAIRMAN: We have an item that is not on the program. Our good friends, the postoffice boys of the city, who serve you faithfully and well here, have a little memento that they wish at this time to present through Mr. Hughes.

MR. HUGHES: Mr. Chairman: As a tribute of their high esteem and the recognition and appreciation of the great advancement and improvement in the United States to the Postoffice Department at our National Capital ,and of the many benefits and advantages which have insured to the employees of this Department throughout our country, for which he is chiefly responsible as a member and former Chairman of the Senate Committee on Postoffices and Post Roads; and as a mark of cordial welcome to him on his first visit to Washington, I desire, on behalf of the employees of the Washington Postoffice, Postmaster Hemphill, his assistants, clerks, carriers, local and rural, to present a floral tribute to our guest, the Honorable Boies Penrose, (applause), Senior United States Senator representing this grand old Commonwealth of Pennsylsanvia. Senator Penrose, these beautiful flowers bloom for you and Uncle Sam's boys at our postoffice welcome you. (Applause)

SENATOR PENROSE: Mr. Chairman, Mr. Hughes—I assure you I appreciate very much this unexpected tribute on your part as representing the Postmaster and employees of the Postoffice in the City of Washington. The tribute is unexpected and I hardly can find words at this time to express the sincere gratification which I feel at realizing the kindly feelings which seem to prevail among the employees of the Postoffice towards me. In the many years during which I was Chairman of the Committee on Postoffices and Post Roads, I always took a pride and ambition in developing the postal service, in raising the standard of the employees, and carrying out, so far as I was able, such legislation as would better and render more comfortable their condition.

When I first became a member of the Committee, the appropriation for the Postoffice Department was under $100,000,000 a year. This year the appropriation is perhaps in the neighborhood of $280,000,000 or $290,000,000. The enormous increase in the brief period of fifteen years illustrates the enormous growth of the United States since the year 1897. When, fifteen years ago, I first began to become familiar with this subject, the rural service, rural delivery service was hardly thought of; it was merely a suggestion. To-day, over 40,000 rural carriers cover routes in the United States. practically placing the newspaper, the periodical literature and the letters, at the door of the farmer. Recently there has been inaugurated a system of Parcels Post which has already assumed great magnitude, and the possibilities of which startle the imagination.

All this has occurred in a short period of fifteen years, and that appropriation which, in 1897, those who were on the Committee served with apprehension and wondered what the country was coming to from the point of view of extravagance, as they beheld the expenditures of the Department pass the hundred million dollar mark, are likely, many of them, to live to see the expenditures of the Postoffice Department reach over $500,000,000 in a very few years. There is no greater barometer of the growth of the country and the enormous development of the country than that splendid army of men, postmasters and clerks and railway clerks and rural carriers, on whose shoulders fall this great burden, whose interests it has always been a pleasure for me to serve and to advance, for I realize that no employees of the Government have greater responsibilities thrust upon them than has he whose duty it is to deliver the citizen the mail, the delay in which or the absence in the delivery of which may cause grave anxiety, business trouble and endless complications, and the railway clerk who travels across the continent every day is exposing his life and his limb to accident and danger in the performance of his duty. Mr. Hughes, I thank you very much. (Applause)

The CHAIRMAN: Taking up the program as it is before you, we have just one absentee, Senator Bourne. I see in looking up his biography that he was born in New Bradford, Mass., Feb. 23, 1855. He attended school at Harvard University. From Harvard he went to sea. He was shipwrecked off Formosa ,picked up and taken to Portland, Oregon. This is the manner in which he returned to the United States. In 1881 he was admitted to the bar. He was a member of the House of Representatives of Oregon, sessions of 1885, 1886 and 1897. In 1907 he was elected to the United States Senate. His term will expire in 1913.

This gives you some idea of his busy and active life. He has been engaged in a number of business enterprises, and we find him to-day advocating the appropriation of three billions of dollars, by the National Government, for the purpose of establishing a great road system, known as Post Roads, throughout the United States, which shows you that he has given the Road question great consideration. That we might place on record what he says in regard to roads, in a letter that he addressed to me, I will at this time call on Prof. Menges to read that letter from Senator Bourne, Chairman of the Joint Committee on Federal Aid in the Construction of Post Roads.

Prof. Menges then read the letter, as follows:

Congress of the United States, Joint Committee on
Federal Aid in the Construction of Post Roads.
Washington, D. C., May 17, 1913.

Hon. George G. Hutchison, Chairman, Good Roads Session, Farmers' Annual Normal Institute, Washington, Pa.

My Dear Mr. Hutchison:

I regret extremely that a temporary indisposition prevents my attending the Good Roads Session of your Institute, to be held May 22,1913. Ever since the receipt of your invitation to make an address at your meeting, I have anticipated with particular pleasure meeting so many of the citizens of Pennsylvania and especially the farmers of your State, so as to avail myself of the opportunity of thanking you for the cordial support received in our efforts to secure the enactment of a parcel post law. As you are perhaps aware, I devoted more than a year to the work of framing a parcel post bill and helping to secure its passage through Congress. I deem it appropriate to say that in all parcel post work both in committee and in the Senate, I had the hearty co-operation and assistance of my friend and co-worker, Senator Boies Penrose, of your State. It is also pertinent to remark, in view of the subject under discussion at this session of your Institute, that Senator Penrose has taken an active interest in the effort to secure practical and wise legislation for Federal aid to good roads, a problem, which, in my opinion, is of far greater economic importance than the parcel post. In fact, I believe the question of good roads overshadows any other economic problem now before the American people. Senator Penrose is a member of the Joint Congressional Committee selected by Congress to make a

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special study of the subject of Federal aid in the construction of Post Roads and his advice in the construction of the bill and influence in securing its enactment will, I am sure, be of the greatest value, as it was in the parcel post legislation.

I have devoted over a year's time, thought and study to the subject of good roads, and some weeks ago evolved a suggested plan and explanation which I have submitted to the Joint Congressional Committee for their consideration, and enclose herewith a copy of same with the thought that after perusal of same you may care to have this letter and a copy of my good roads plan read for the purpose of giving your audience an opportunity of presenting criticisms, comments and suggestions, in the adoption of which the plan would be improved.

Should the plan be adopted by Congress, Pennsylvania, after amending her Constitution, would be entitled, if she saw fit, to receive $56,500,000 in five years from the Federal Government to aid in road construction in your State; provided she complied with the requirements of the plan and issued $56,000,000 of Pennsylvania fifty year four per cent. bonds and deposited same with the Treasurer of the United States, paying annually into the United States Treasury $2,260,000 in interest. At the expiration of fifty years from the date of the issuance of the bonds, the State bonds would be returned to the State, canceled. Thus Pennsylvania would pay in fifty years $113,000,000 for the use of the $56,500,000 furnished by the Federal Government. If Pennsylvania could sell her fifty-year bonds in the open market on a three per cent. basis she would pay in fifty years $84,750,000 in interest and then have to repay the principal of $56,500,000, or a total of $141,250,000 in fifty years, or $28,250,000 more than she would pay if my suggested plan were adopted and she took advantage of the opportunity in securing her $56,500,000 from the Federal Government on a four per cent. basis, with the principal taken care of at the end of the fifty years by the Federal Government out of the sinking fund.

Furthermore, under my plan, Pennsylvania would receive each year from the Federal Government $1,130,000 for road improvement and maintenance provided she contributed an equal amount.

Again expressing through you to the members of your Institute my regret that conditions deny me the pleasure of meeting with you, I remain,

Very respectfully yours,

(Signed) Jonathan Bourne, Jr.

**DIRECTOR MARTIN:** I move that the letter addressed to this Convention by Senator Bourne be made a part of the proceedings of this Institute.

The motion was seconded and adopted.

# FEDERAL AID TO GOOD ROADS

**Suggested Plan for intelligent and Practical Expenditure of Three Billions of Dollars during a Period of Fifty Years by the States and Federal Government in the Construction, Improvement and Maintenance of Good Roads.**

By HON. JONATHAN BOURNE, JR., *United States Senator from Oregon*

*To the members of the Joint Committee on Federal Aid in the Construction of Post Roads*:

Gentlemen: Outside of a few great fundamentals of government, I deem Federal aid to good roads the greatest, and certainly the most important economic question now before the American people. Better, cheaper, and additional transportation facilities in the United States must benefit every inhabitant and result in more development and greater productiveness of our natural resources, meaning more and cheaper food and necessities of life. Large areas of virgin territory must be developed, first by trails, then by roads, next steam railroads, then electric lines and, finally, by a system of intelligently and honestly constructed and maintained wagon roads which, in this petrol age ,with its motor truck and passenger bus, should vastly increase the happiness, prosperity, and comfort of our people and double the value of our agricultural lands. A great system of rural transportation would be developed with rates regulated by actual competition, open to poor and rich alike, as no expensive privately owned terminals, roadbeds, tracks, or equipment would be required. The good wagon roads would be open to the use of everybody, and the equipment, relatively inexpensive, would be within the means of many.

It is generally conceded that the Federal Government, under the post roads and commerce clauses of the Constitution, unquestionably has the right to make appropriations for or otherwise aid in the construction and maintenance of good roads.

## ESSENTIALS OF A SATISFACTORY PLAN

About a year ago I began the study of Federal aid to good roads. After devoting considerable time and thought to the problems involved I arrived at the following general conclusions:

(1) A plan should be developed that would be satisfactory and acceptable to the Federal Government and the 48 States, representing, in effect, 49 different personal equations, thus insuring co-operation between the Federal Government and the States.

(2) A plan to be satisfactory must be practicable, simple, and so framed as to insure the most intelligent and honest expenditure of funds, whether contributed by the States or by the Federal Government, or both.

(3) The Federal Government's contribution or plan of co-operation must be such as to induce the States to undertake road construction, improvement, and maintenance actively, intelligently, and extensively.

(4) The plan should not only encourage construction but insure improvement and maintenance of roads already built or to be built.

(5) The money expended to-day should benefit, and coordinate with the money to be expended years hence; in order words, the expenditures of today should be so made as to correlate with the expenditures of the future.

(6) Federal supervision of expenditures of the Federal money should not interfere with the rights of States or lead to a Federal espionage irritating to the States and resulting in the building up of a great Federal bureau.

(7) Any plan of Federal aid or cooperation must insure an equitable apportionment among the 48 states.

I was convinced of the desirability of the earliest possible solution of the problem to prevent unintelligent or undesirable legislation in response to the steadily insistent, growing demand for Federal aid in the construction of good roads.

### SUGGESTED BILL

For a number of months I sought in vain for a key to the problem, but finally an idea occurred to me from which I evolved a plan that, after weeks of careful analysis and study, appeals to me as having merit, and I therefore respectfully submit the same herewith in the form of a suggested bill for your consideration. criticism, modification, adoption, or rejection:

> *Be it enacted by the Senate and House of Representatives in Congress assembled,* That in order to establish, construct, improve, or maintain public roads that are now or may hereafter be needed for use as post roads, military roads, or for interstate commerce, there be, and hereby is, created a fund to be known as the United States Highway Fund. Said fund shall be raised in the manner herein provided, but the Treasurer of the United States is hereby authorized to receive and place to the credit of said fund any money that may be contributed from other sources and to expend the same upon the order of the United States Highway Commission or in accordance with the conditions of the contribution.
>
> Sec. 2. That for the purpose of providing money for the United States Highway Fund the Secretary of the Treasury is hereby authorized and directed to issue and sell by popular subscription and upon a pro rata allotment basis, at not less than par, bonds of the United States in such form as he may prescribe and in denominations of $20 or multiples of that sum, said bonds to be payable 50 years from the date of issue and to bear interest, payable semiannually, at the rate of 3 per cent per annum, the total amount of said bonds not to exceed $1,000,000,000, and the issue and sale of same not to exceed such amounts as may be necessary from time to time to enable the Treasurer of the United States to make payments from the United States highway fund to the several States in accordance with the provisions of this act. Bonds issued issued under authority of this act or the income therefrom shall not be subject to taxation of any kind for any purpose.

Sec. 3. That before any State shall be entitled to take advantage of the provisions of the act, it shall establish by law a State highway commission having general supervision of road construction and improvement in that State, which said commission shall have general supervision of the expenditure of money received from the United States Highway Fund, subject only to the provisions of this act and of State laws not inconsistent therewith.

Sec. 4. That the United States Highway Fund shall be apportioned and credited to the several States in the following manner: The United States Highway Commission hereinafter created, shall ascertain in the most practicable manner from the best information available the total land area, the population according to the last Federal census, the total assessed valuation of all taxable property, and the total mileage of public highways in each of the several States, and shall compute the percentage of the total of each of these four items possessed by each State. They shall then compute the average of the four percentages for each State, and this avearge shall be the per cent of the $1,000,000,000 United States Highway Fund that shall be apportioned and credited to each State. Said commission shall notify the Treasurer of the United States of the result of their ascertainment and computation, which shall be made as of a date to be fixed by the commission. Such fund, so apportioned, shall be paid to the States only in accordance with the provisions of this act.

Sec. 5. That whenever any State, through its duly authorized agents, shall apply for any part of its share of the United States Highway Fund, but not exceeding 20 per cent thereof in any year, and shall deposit with the Treasurer of the United States its bonds for such amount payable in 50 years and bearing interest, payable semiannually, at the rate of 4 per cent per annum, said Treasurer of the United States will issue and sell by popular subscription and upon a pro rata allotment basis United States highway bonds herein authorized to the amount that may be necessary to pay to said State the amount of money applied for, and upon the sale of said bonds shall pay over the proceeds to the custodian of the public funds of the State: *Provided,* That the bonds of any State shall not be accepted if the total amount of bonds of such State, including the bonds issued to take advantage of the provisions of this act, shall exceed 10 per cent of the amount of the assessed valuation of all taxable property in such State. When the Treasurer of the United States shall receive any payment of interest on State bonds deposited in the manner above provided he shall devote three-fourths thereof to the payment of the interest due on the corresponding United States highway bonds and one-fourth, herein designated as a sinking fund, he shall deposit in the Treasury of the United States to be used from time to time as the general funds of the United States are used. The Treasurer of the United States shall keep an account with each State that shall deposit bonds and receive funds under the provisions of this act, and shall credit said State with interest compounded annually at the rate of 3 per cent per annum on the sinking funds paid in. At the time of the maturity of the bonds deposited by any State, if all payments of interest have been made when due, the Treasurer of the United States shall cancel said bonds and return them to the State isuing the same, without requiring any payment of the principal.

Sec. 6. That on the 1st day of February of each year the Treasurer of the United States shall pay to the custodian of the public funds of each State, from any funds in the Treasury not otherwise appropriated, an amount of money equal to 2 per cent of the amount of State bonds said State has on deposit with the Treasurer of the United States under the provisions of this act. The money so paid shall be expended by said State only in the maintenance of public highways. The Treasurer of the United States shall withhold the payment of money to any State under the provisions of this section in the event that such State default in payment of any interest due or in the event that the United States Highway Commission herein created shall certify to said United States Treasurer that money theretofore paid to said State for maintenance purposes has not been expended with reasonable effectiveness for the maintenance of public highways or that the State has failed to expend an equal amount of its own funds during the preceding 12 months for the same purpose.

Sec. 7. There is hereby created a United States Highway Commission, to be composed of the chairman of the Senate Committee on Post Offices and Post Roads, the chairman of the House Committee on the Post Office and Post Roads, and the Director of the Office of Public Roads. Such commission shall have only an advisory voice in the expenditure of the United States Highway Fund in the several States. It shall have its head office in the District of Columbia, but may create highway divisions, never exceeding in number one for each State and may maintain a division office in charge of a United States highway engineer in each division. Said commission shall have power to employ such clerical and expert assistance as may be provided for by appropriations made by Congress from time to time, and may require the assistance and cooperation of the officers and employees of any department in its work.

Sec. 8. For the further aid and encouragement of highway improvement in the several States, the United States Highway Commission shall maintain in the District of Columbia a school for special instruction in practical highway and bridge engineering, the entrance requirements of which school shall include completion of preparatory courses in civil engineering and such other studies as the commission shall specify qualifying the student to enter upon the special study of the practical problems of highway and bridge engineering. The rules, regulations, and curriculum of said school shall provide for instruction for two years for one student from each congressional district, selected by competitive examination, but if there be no qualified applicant for admission from any congressional district such vacancy may be filled by the admission of a student from some other congressional district in the same State. Upon the admission of a student to the school of highway engineering such student shall be paid as traveling expenses 4 cents for each mile of distance necessarily traveled in going from his home to Washington, D. C., and at the end of each calendar month thereafter during the continuance of of such student in said school he shall be paid $50 to cover living and incidental expenses. The United States Highway Commission shall make rules and regulations for the management of said school and shall have entire control of same, subject only to the Constitution and laws of the United States. In connection with said school said commission shall maintain a testing laboratory in which said commission shall cause tests to be made of road or bridge building material free of charge at the request of the duly authorized highway officials of any State.

Sec. 9. That for the purpose of carrying out the provisions of this act, there is hereby appropriated out of any moneys in the United States Treasury not otherwise appropriated, the following amounts, or so much thereof, as may be necessary;

For the renting of suitable quarters for the United States Highway Commission in the District of Columbia, $———.

For the renting of suitable quarters for the school of highway and bridge engineering, $———.

For the payment of salaries of clerical and expert assistance for the United States Highway Commission, $———.

For the payment of salaries of instructors in the school of highway and bridge engineering, $———.

For the purchase of testing laboratory equipment and office furniture and supplies, $———.

For the payment of the salaries of ——— division engineers, $———.

For the renting of quarters for ——— division engineers, $———.

## APPROXIMATE APPORTIONMENT TO STATES

I submit herewith a table showing the percentage and amount of apportionment each State would be entitled to receive under a plan giving area, population, assessed valuation, and road mileage equal weight in the calculation, these percentages being computed only to two decimal places and the amounts given in round numbers.

| State. | Land area in square miles. | Population, 1910. | Assessed valuation, fiscal year 1912. | Total mileage of roads. | Apportionment to Each State. | |
|---|---|---|---|---|---|---|
| | | | | | Per cent. | Amount. |
| Alabama, | 51,279 | 2,138,093 | $484,851,212 00 | 49,639 | 1.72 | $17,200,000 |
| Arizona, | 113,840 | 204,354 | 140,338,191 00 | 5,987 | 1.13 | 11,300,000 |
| Arkansas, | 52,525 | 1,574,449 | *425,478,614 00 | 36,445 | 1.44 | 14,400,000 |
| California, | 156,092 | 2,377,549 | 2,919,342,889 00 | 48,069 | 3.59 | 35,900,000 |
| Colorado, | 103,658 | 799,024 | 430,000,000 00 | 29,693 | 1.59 | 15,900,000 |
| Connecticut, | 4,820 | 1,114,756 | *1,041,334,019 00 | 12,583 | .87 | 8,700,000 |
| Delaware, | 1,965 | 202,322 | 92,575,760 00 | 3,000 | .14 | 1,400,000 |
| Florida, | 54,861 | 752,619 | 218,887,518 00 | 17,579 | .96 | 9,600,000 |
| Georgia, | 58,725 | 2,609,121 | 842,000,000 00 | 82,230 | 2.45 | 24,500,000 |
| Idaho, | 83,773 | 325,594 | 418,780,394 00 | 18,403 | 1.16 | 11,600,000 |
| Illinois, | 56,002 | 5,638,591 | 2,343,673,232 00 | 94,141 | 3.94 | 39,400,000 |
| Indiana, | 35,885 | 2,700,876 | 1,891,602,077 00 | 67,996 | 2.51 | 25,100,000 |
| Iowa, | 55,586 | 2,224,771 | 713,318,825 00 | 102,427 | 2.50 | 25,000,000 |
| Kansas, | 81,774 | 1,690,949 | 2,746,900,291 00 | 98,302 | 3.28 | 32,800,000 |
| Kentucky, | 40,181 | 2,289,905 | 1,089,265,148 00 | 53,744 | 1.98 | 19,800,000 |
| Louisiana, | 45,409 | 1,656,388 | 546,650,157 00 | 24,962 | 1.32 | 13,200,000 |
| Maine, | 29,895 | 742,371 | 478,192,054 00 | 25,528 | .98 | 9,200,000 |
| Maryland, | 9,941 | 1,295,346 | 979,309,976 00 | 16,773 | .99 | 9,900,000 |
| Massachusetts, | 8,039 | 3,366,416 | 4,249,699,855 00 | 17,272 | 2.73 | 27,300,000 |
| Michigan, | 57,480 | 2,810,173 | *2,288,000,000 00 | 68,906 | 2.88 | 28,800,000 |
| Minnesota, | 80,858 | 2,075,708 | 1,212,567,794 00 | 79,323 | 2.59 | 25,900,000 |
| Mississippi, | 46,362 | 1,797,114 | *399,029,000 00 | 39,619 | 1.48 | 14,800,000 |
| Missouri, | 68,727 | 3,293,335 | 1,736,371,588 00 | 107,923 | 3.35 | 33,500,000 |
| Montana, | 145,776 | 376,053 | 346,550,585 00 | 23,319 | 1.72 | 17,200,000 |
| Nebraska, | 76,808 | 1,192,214 | 463,371,889 00 | 80,338 | 2.05 | 20,500,000 |
| Nevada, | 109,821 | 81,875 | *85,347,058 44 | 12,751 | 1.12 | 11,200,000 |
| New Hampshire, | 9,031 | 430,572 | 397,647,530 00 | 15,116 | .51 | 5,100,000 |
| New Jersey, | 7,514 | 2,537,167 | 2,289,770,280 78 | 14,842 | 1.77 | 17,700,000 |
| New Mexico, | 122,503 | 327,301 | †72,000,000 00 | 16,920 | 1.35 | 13,500,000 |
| New York, | 47,654 | 9,113,614 | 11,022,985,914 00 | 79,279 | 7.86 | 78,600,000 |
| North Carolina, | 48,740 | 2,206,287 | *494,708,570 00 | 48,285 | 1.74 | 17,400,000 |
| North Dakota, | 70,183 | 577,056 | 294,770,325 00 | 61,593 | 1.56 | 15,600,000 |
| Ohio, | 40,740 | 4,767,121 | 6,400,000,000 00 | 88,861 | 5.02 | 50,200,000 |
| Oklahoma, | 69,414 | 1,657,155 | 1,326,840,833 00 | 71,325 | 2.33 | 23,300,000 |
| Oregon, | 95,607 | 672,765 | ‡905,011,679 00 | 29,475 | 1.66 | 16,600,000 |
| Pennsylvania, | 44,832 | 7,665,111 | 5,917,119,205 25 | 87,387 | 5.65 | 56,500,000 |
| Rhode Island, | 1,067 | 542,610 | 552,991,854 00 | 2,121 | .89 | 3,900,000 |
| South Carolina, | 30,495 | 1,515,400 | 291,531,003 00 | 32,075 | 1.15 | 11,500,000 |
| South Dakota, | 76,868 | 583,888 | 354,278,418 00 | 56,354 | 1.58 | 15,800,000 |
| Tennessee, | 41,687 | 2,184,789 | 625,010,886 00 | 45,913 | 1.70 | 17,000,000 |
| Texas, | 262,398 | 3,896,542 | 2,515,594,636 00 | 128,971 | 5.66 | 56,600,000 |
| Utah, | 82,184 | 373,351 | 200,299,207 00 | 8,320 | .96 | 9,600,000 |
| Vermont, | 9,124 | 355,596 | 221,447,887 00 | 14,406 | .42 | 4,200,000 |
| Virginia, | 40,262 | 2,061,612 | 907,273,651 00 | 43,399 | 1.73 | 17,300,000 |
| Washington, | 66,836 | 1,141,990 | 1,005,086,251 00 | 34,284 | 1.64 | 16,400,000 |
| West Virginia, | 24,022 | 1,221,119 | 1,119,828,173 00 | 32,109 | 1.32 | 13,200,000 |
| Wisconsin, | 55,256 | 2,333,860 | 2,077,925,166 00 | 61,090 | 2.56 | 25,600,000 |
| Wyoming, | 97,594 | 145,965 | 182,028,280 00 | 10,569 | 1.05 | 10,500,000 |
| Totals and average, | 2,974,099 | 91,272,266 | $67,763,587,864 45 | 2,199,646 | ...... | $1,000,100,000 |

*1911. †Rough estimate. ‡1910.

## REASONS FOR FACTORS USED

To my mind, area should be a factor because of the greater necessity for more or better roads in the newer or larger States; population a factor because whatever direct contribution is made by the people through the Federal Government is a tax on all the people; assessed valuation of the property in each State a factor because of the utilization of the Federal credit through the Government becoming practically an indorser for the States under my suggested plan, and because the taxable property of the State must bear a large proportion of the State's expenditure for road improvement, hence the property of the States should receive recognition in accordance with the liability assumed; and mileage of roads already in use a factor as a recognition of industry and efficiency of those States that have already constructed roads at their own expense.

Enactment of legislation herein suggested would benefit the States by the utilization of the credit of the Federal Government superior to that enjoyed by the States. On February 28, 1913, the interest-bearing debt of the United States was as follows:

| | |
|---|---|
| 2 per cent. bonds, | $730,882 130 |
| 3 per cent. bonds, | 113,945 460 |
| 4 per cent. bonds, | 118,489 900 |
| 2½ per cent. bonds, | 2,380 120 |
| Average, 2.37 per cent. bonds, | $965,697,610 |

The low average of 2.37 per cent interest is, of course, due to the national bank circulation privilege and the nontaxable feature of those bonds. I believe that for many years to come the Federal Government will have no difficulty in selling a billion 50-year non-payable 3 per cent semiannual interest bearing bonds at par or better by popular subscription, especially if not more than 20 per cent could be sold in any one year. I doubt if, as a whole, the States would be able to sell 50-year State bonds at par at any lower rate of interest than 4 per cent. I figure the national wealth of the United States at $14,000,000,000. With our enormous undeveloped natural resources, steadily increasing population, great virility, energy, and industry of our people this wealth must steadily and enormously increase. According to the United States Office of Public Roads the agregate assessed valuation shown by the different States for the year 1912 is $67,763,587,864.45, but there is a vast difference in ratio of assessed to actual value in the different States, some States endeavoring to assess on full cash value of property and others as low as 12.5 per cent.

The suggested plan, if adopted, enables the States to enjoy the superior credit of the Federal Government and without additional cost to the States establishes a sinking fund that in 50 years' time would pay off the States' indebtedness. At the same time the Federal Government really assumes no consequential responsibility, as no State would default on its principal or interest charges it the total bonded indebtedness of the State did not exceed 10 per cent of the assessed value of the property in the State. A sinking fund of $1, or 1 per cent per year, payable at the end of each year, with annual interest on each payment at the rate of 3 per cent compounded each year with amount to $100, or 100 per cent, in 46.89 years.

## HOW THE PLAN WOULD OPERATE

To illustrate the practical working of the plan, let us suppose that all the States avail themselves of the opportunity of utilizing the superior credit of the United States up to the 20 per cent annual limitation for each State. We would have $200,000,000 of 50-year semiannual 4 per cent State bonds deposited with the Treasurer of the United States, upon which collateral the Secretary of the Treasury would offer for popular subscription, at not less than par and upon a pro rata allotment basis, $200,000,000 of 3 per cent Federal bonds, and from the $200,000,000 obtained in the sale of the same, pay to the States the par amount of their bonds according to the percentage of apportionment set forth in the bill. The Federal Government would receive from the States, in semiannual payments, interest at the rate of 4 per cent, or $8,000,000 annually, out of which it would pay to the investors in the Federal bonds $6,000,000 annually, to pay annual interest of 3 per cent on $200,000,000 United States 50-year 3 per cent bonds, leaving an excess of $2,000,000 annually received from the States over what the Federal Government would pay in interest charges on a similar amount of Federal bonds.

On this excess of $2,000,000 the Federal Government would allow 3 per cent annual compound interest. At the end of 46.89 years this sinking fund would amount, under this plan, to $200,000,000, so that the Federal Government would have the funds to pay off the bonds it had issued to the public for which it held the State bonds as collateral, and at the end of 50 years from the date of issuance of the State bonds the Federal Government would return said bonds to the respective States marked "Canceled." By depositing their bonds with the Federal Government as collateral and utilizing the superior credit of the Federal Government in getting money at 3 per cent, the States would ultimately have received $200,000,000 cash at 1 per cent cheaper interest than they themselves could secure in a public sale of their own bonds. This utilization of the Federal Government's superior credit, without any greater expense to the States than the interest charge alone if they sold their bonds in the open market, together with the Federal Government's 3 per cent annual interest allowance, would provide the fund with which the obligation of the States would be entirely liquidated at the expiration of 50 years.

The proceeds from the sale of the Federal bonds would be turned over to the highway commissions in the States, an instrumentality which should be directly responsive and accountable to the electorate of the States, thus preventing interference with State rights and eliminating any legal supervision on the part of the Federal Government and minimizing the danger of building up a large Federal bureau. At the same time cooperation would be assured through realization on the part of the members of the State highway commissions that although the Federal district engineers would have no legal supervision as to the expenditure of money put into construction of roads, yet in their inspection of the maintenance of roads the Federal and district engineers would necessarily learn whether the road construction had been honest and intelligent, and the anticipation of this maintenance inspection by Federal agents would cause the State engineers to do better construction work. Thus is created an equal optional opportunity to all the States. True some States will have to adopt constitutional amendments before they can issue bonds for public improvements. Under my plan, however, the Federal Government furnishes the opportunity. Each State must decide if it desires to accept it. If so, it must comply with the Federal requirements. It could take as much or as little money as it desired except it could not exceed 20 per cent of its apportionment in any one year and in an aggregate of years could not exceed its total apportionment.

I requested Mr. J. E. Pennybacker, the committee's satistician, to examine the constitutions of the different States and submit a list of those States authorized to borrow money for public works and of the States which would require a constitutional amendment giving such authority.

The States permitted to issue bonds for public works and the amounts each would receive from my plan are as follows:

| | |
|---|---|
| Alabama, | $17,200,000 |
| California, | 35,900,000 |
| Connecticut, | 8,700,000 |
| Delaware, | 1,400,000 |
| Idaho, | 11,600,000 |
| Illinois, | 39,400,000 |
| Iowa, | 25,000,000 |
| Kansas, | 32,800,000 |
| Kentucky, | 19,800,000 |
| Maine, | 9,200,000 |
| Maryland, | 9,900,000 |
| Massachusetts, | 27,300,000 |
| Minnesota, | 25,900,000 |
| Mississippi,† | 14,800,000 |
| Montana, | 17,200,000 |
| New Hampshire, | 5,100,000 |
| New Jersey, | 17,700,000 |
| New Mexico, | 13,500,000 |
| New York, | 78,600,000 |
| North Carolina, | 17,400,000 |
| Oklahoma, | 23,300,000 |
| Rhode Island, | 3,900,000 |
| South Carolina, | 11,500,000 |
| Tennessee,† | 17,000,000 |
| Vermont,† | 4,200,000 |
| Washington, | 16,400,000 |
| Wyoming, | 10,500,000 |
| | $515,200,000 |

51.52 per cent. of the total.

---

†Constitution is silent on this subject.

The States in which constitutional amendments are necessary to permit issuance of bonds for public works and the amount each State would receive under my plan are as follows:

| | |
|---|---|
| Arizona, | $11,300,000 |
| Arkansas, | 14,400,000 |
| Colorado, | 15,900,000 |
| Florida, | 9,500,000 |
| Georgia, | 24,500,000 |
| Indiana, | 25,100,000 |
| Louisiana, | 13,200,000 |
| Michigan, | 28,800,000 |
| Missouri, | 33,500,000 |
| Nebraska, | 20,500,000 |
| Nevada, | 11,200,000 |
| North Dakota, | 15,600,000 |
| Ohio, | 50,200,000 |
| Oregon, | 16,600,000 |
| Pennsylvania, | 56,500,000 |
| South Dakota, | 15,800,000 |
| Texas, | 56,600,000 |
| Utah, | 9,600,000 |
| Virginia, | 17,300,000 |
| West Virginia, | 13,200,000 |
| Wisconsin, | 25,600,000 |
| | $484,900,000 |

48.49 per cent of the total.

## BONDS WOULD BE OBSERVED

The 20 per cent per annum limitation and the fact that States representing practically 50 per cent of the proportional allotment would have to amend their constitutions before permitted to issue bonds for public improvement, clearly shows that not over $100,000,000 of Federal bonds would be offered for sale in any one year. Would the people absorb this amount of Federal 3 per cent nontaxable 50-year bonds? In my opinion they unquestionably would.

These bonds being nontaxable, would be the equivalent of a 4 per cent taxable bond, especially if the contemplated income tax be enacted.

The banks of the United States showed the following individual deposits on June 14, 1912:

| | Number. | Amount. | Average rate of interest paid depositors. |
|---|---|---|---|
| National banks, | 7,372 | $5,825,461,163 36 | No data. |
| Mutual savings banks, | 630 | 3,608,657,828 11 | 3.90 |
| Stock savings banks, | 1,292 | 842,897,859 61 | 3.03 to 3.64 |
| State banks, | 13,381 | 2,919,977,897 99 | No data. |
| Private banks, | 1,110 | 152,494,618 90 | No data. |
| Loan and trust companies, | 1,410 | 3,674,578,238 92 | No data. |
| Total, | 25,195 | $17,024,067,606 89 | ........... |

Note that 3.90 per cent is the average rate of interest to depositors in the 630 mutual savings banks, and 3.03 per cent to 3.64 per cent is the rate of interest paid depositors in the 1,293 stock savings banks. There can be no doubt but what depositors in these institutions would prefer the Federal 3 per cent. nontaxable bonds with the Government credit behind them to the security and interest offered by the savings banks.

In 1912 the volume of transactions in the 151 clearing houses of the United States was $168,506,320,000. With this volume of clearances the American people would certainly absorb, if given an opportunity, $100,000,000, or several hundred million of 50-year 3 per cent nontaxable Federal bonds.

On June 30, 1912, according to the Comptroller of the Currency, there was $3,264,500,000 of coin and other money in the United States, of which $1,563,800,000 was in the bank, thus leaving $1,700,700,000 in the tills, pockets, and stockings of the people, a large proportion of which amount would undoubtedly be invested in these Federal bonds if offered for popular subscription on a pro rata allotment basis.

The requirement that the bonds shall be sold by public subscription and upon a pro rata allotment basis would prevent a few very rich men acquiring the bonds in the original purchase. In order for them to acquire more than their proportional allotment under the original subscriptions, they would have to pay other subscribers and allotees such premiums as they would be willing to accept.

## AID IN ROAD MAINTENANCE

Maintenance of roads is a factor which should be given weight equal with construction. The Federal Government, by the suggested plan, would contribute—donate, if you please—to each State 2 per cent of the total amount of Federal aid that had been extended to the State for construction in utilization of the Federal Government's superior credit. Thus, the States, if they deposited the aggregate of $200,000,000 of State bonds during any one year and received $200,000,000 in money from the Federal Government, would thereafter receive $4,000,000 annually as a direct contribution from the Government, provided these States expended an equal amount for annual maintenance.

Where direct Federal contributions are made, it is desirable that direct Federal supervision should be provided, and here we again get into the danger zone of the creation of a great Federal bureau. France, after a hundred and fifty years effort and an expenditure of a billion and a half dollars in building up its system of roads has 371,000 miles with 80,000 patrolmen for care and maintenance. The United States has to-day, in round numbers, $2,200,000 miles of road and if we had a patrolman to maintain every 5 miles of road we would have an organization of 440,000 Federal employes directly responsive to a bureau here in Washington, and the tendency would be for its centralization as a political machine, which, under our system of Government, would absolutely control the political machinery of the country. To minimize this danger, and, I think, avoid same, I would suggest that either in the law or by authorized rule and regulation we divide the United States into Federal road districts composed of States or groups of States containing approximately 50,000 miles of roads and create in the Office of Public Roads a number of district road and bridge engineers, so that there would be one Federal representative for each district.

The duties of this engineer would be to go over his district and report to the United States Highway Commission here in Washington whether the annual maintenance contribution of the Government apportioned to that district had been intelligently and honestly expended. He could also give lectures as opportunity permitted, regarding road engineering and practical construction, also furnish the State highway commisions with such information as the Federal bureau had, touching on the subject, but neither he nor his superior, the Federal Director of Public Roads, would have the right to withhold the Federal maintenance actually contributed to his district simply because his judgment differed from that of the State highway commission with reference to intelligent and honest expenditure of the Federal part of the maintenance fund. The United States Highway Commision; consisting of the chairman of the two Committees on Post Offices and post Roads, with the Director of Public Roads, would have the final voice and decision as to whether this fund should be withheld or not.

My idea in making the two chairmen of the Post Offices and Post Roads Committees ex officio members of the highway commission is that much valuable information could be secured from the 43,000 rural carriers under the Fourth Assistant Postmaster General's jurisdiction and which comes directly under that of these congressional commitees, and for the further reason that as an expenditure of the people's money is involved, and as Congress under our form of government is the only direct representative of the people, the determinative power of withholding maintenance should be in Congress and not in a bureau; and for the still further reason that the patrol system built up in the States and responsive to the State highway commissions, if under the subservience of the Federal bureau, would be responsive to a Federal head and the danger would exist of building up a big Federal political machine. The Federal commission would have the advantage of the special training, skill, and development of the Director of the Office of Public Roads, but the Senator and Member of Congress, chairman of the Committees on Post Offices and Post Roads, being a majority of the commission, would decide as between the Federal bureau and the highway commission of the State, thus avoiding making the State instrumentality subordinate to a Federal bureau head or department. If the road-patrol system is to be used as a political machine it is much better from the general-welfare standpoint that the danger of misuse should be minimized by dividing same into 48 State machines responsive to the State instrumentalities rather than directly to the Federal bureau here in Washington.

## AID BY EDUCATION

The creation of a Federal academy of engineering for road and bridge construction here in Washington appeals strongly to me as desirable to provide a national institution for the education and increased efficiency of technical experts so that an annual supply of qualified engineers would be furnished from which the States could draw for their State and district supervision, and I would suggest liberal appropriations for that institution, and the creation therein of a national laboratory in which to test all road material sent in by citizens or State highway commissions to the Federal bureau to secure information and advice in reference to available material for both road construction and maintenance. The Federal bureau would act as a medium for the dissemination of information bearing particularly on the subject of good road and bridge construction according to the experience and development of that art not only here in this country but throughout the world.

## ADVANTAGE OF THE PLAN

In conclusion, I realize that the suggested bill can undoubtedly be improved, but after many weeks' thought and study on the subject it apeals to my mind as presenting a plan of which at least some portions can be utilized to advantage. The strong features are:

Incentive to the States for activity and expedition in road construction by utilization of the superior credit of the Government.

The establishment of practical and desirable cooperation between the Federal Government and the States.

Teamwork between the Federal specialists on good roads and the State specialists, without subservience in the State instrumentality to any Federal bureau or department.

The establishment of a practical concrete plan for a long period with definite knowledge as to the liability of the Federal Government (its liability in the indorsement of the State credit being inconsequential in one viewpoint, namely, that the State would ever default either on principal or interest of its bonds).

A bond limitation of 10 per cent of assessed property valuation, with realization that default in payment of interest or principal to the Federal Government must result in discontinuance of future Federal assistance and cessation of immigration or further outside investment in the State, would eliminate possibility of any default.

Under my plan the maximum annual liability of the Federal Government would be $200,000,000 contribution for maintenance, thus relieving Members of both branches of Congress from the tremendous pressure for increased appropriations in various congressional districts and States.

The minimization of the possibility of building up a great Federal machine necessarily resultant upon direct supervision by a Federal bureau or giving a department head the right of determination as to whether Federal funds should continue or not.

The establishment of a Federal academy for the development and training of specialists in road and bridge construction, thus supplying for the States and districts a corps of trained specialists and also a medium for the best information bearing on the subject and creating an instrumentality for consultation and interchange of ideas.

My plan rather prevents the possibility of centralization of power in the Federal Government, protects and preserves the rights of the States, improves the State instrumentalities in efficiency, and establishes cooperation, practicable and desirable, between the Federal Government and the States.

The adoption of this comprehensive plan insures an opportunity, extending over a period of fifty years, for the expenditure of three billions of dollars in improvement and maintenance of wagon roads in the United States, thus giving useful employment to many people and providing systematic and intelligent highway construction, resulting in the United States securing what would probably be the best and most extensive system of highways in the world and increasing our national wealth many, many times the amount of the investment.

Respectfully submitted,

JONATHAN BOURNE, JR.

The CHAIRMAN: After a gentleman has spoken to you so eloquently and nicely as my friend has, it is a little late to introduce him. But I cannot let the occasion go by without saying a word in regard to the record of our friend and distinguished visitor who is going to address us this afternoon.

Some years ago I was an attache of the State Senate, and there formed the acquaintance of these two gentlemen that are sitting here to my right. I was then very much interested in the tax legislation known as the Taggard Bill, which is very well known to some of my Granger friends who are present, and of course, I was keeping tab on all the Senators and members of the House in regard to this legislation for the equalization of taxation, and I found that this gentleman was in thorough accord with the farmers and laboring people of Pennsylvania.

I am just going to quote this afternoon from the words of a member of this Board or a statement of a member of this Board, the distinguished member from Center county, Col. John A. Woodward, who served in the House with the distinguished Senator, the lower House of Representatives at Harrisburg, and was a trustee of State College and was on the Committee for many years. He said, in the years of Senator Penrose's life and work in the lower House of Representatives, in the Senate of Pennsylvania, and in the National Congress of Washington, he had never cast a vote against the laboring man or wage earner or the farmers' interest. That comes from a Democrat of the Democrats and a truthful man, and today Senator Penrose comes here in our interest, in the interest of the people of Pennsylvania, advocating good roads, and it is with pleasure that I introduce to you this afternoon, Senator Boise Penrose, the Senior Senator from Pennsylvania. (Applause).

## ADDRESS OF SENATOR BOISE PENROSE

**Representing the Joint Committee on Federal Aid in the Construction of Post Roads.**

Mr. Chairman, Ladies and Gentlemen: I am here for the purpose of having the pleasure of meeting so many of my constituents at this distinguished gathering, evidently taken from all over the State of Pennsylvania, because I have had the pleasure of meeting old friends here from the eastern section of the State and from all over, and also as a member of what is known as the Joint Good Roads Committee of Congress, the official title of which is Joint Committee on Federal Aid in the Construction of Post Roads. It is needless for me to say that it has given me great pleasure today to shake hands with most of you and to renew old acquaintances.

While this is my first visit to the Borough of Washington, it is not my first visit to the county, and I only regret that I have not been able to get out here more often. But I have known your distinguished Chairman for twenty-five years and your Secretary of Agriculture, I served with as a colleague in the State Senate, and he and I, according to my recollection, sat down and talked together and had a bill drafted for a Department of Agriculture several years before the Legislature finally acted and created one.

The Committee on Good Roads of Congress has been doing considerable work, recognizing the paramount importance of the issue of good roads before the American people. The Commission was created originally in the early days of the last Congress and the personnel of the Commission and the Commission itself was continued after the expiration of the last Congress, and during this winter the Commission has been in constant session, holding hearings, communicating with every Highway Department all over the United States and corresponding with foreign governments, in order to gather data as to what is being done and has been done abroad. I have had sent here from Washington five hundred sets of the preliminary reports of the Commission, which you will find at the close of the meeting, some of them under the desk and others elsewhere, perhaps. They are distributed around in the audience and I would ask those of you who are sufficiently interested in the subject, to get these hearings and preliminary reports and familiarize yourselves with the status of the matter from the point of view of the American Congress.

Now many people doubt the wisdom of Congress getting into this situation. They argue that the states ought to construct good roads in their various limits. But there is a situation growing up which makes the Federal Government take cognizance of the question of good roads and that is due to the enormous extension of the work of the Postoffice Department. The rural carrier service alone compels the Postoffice Department to consider the question of good roads. Some 40,000 or 45,000 carriers transport the mail over the rural routes throughout the country and the strength of their equipment, the number of horses they must have, the salaries they are entitled to, whether the transportation shall be by horse and wagon or by automobile, in fact, the whole question of the renumeration of the carrier and the expenditure for the service. which runs up to the enormous sum of fifty or sixty million dollars, is dependent on the question of the character of roads in the different localities.

In a section where the rural delivery is carried over a macadamized road or brick road or good asphalt road, the expense, of course, is very much diminished as compared with the expense in a section where it has to be carried over roads such as exist in many of the Southern States, where the advance in road transportation is hardly ahead of what it was a hundred years ago. In addition to that, the Parcels Post is tending in the same direction. If there is to be an enormous amount of packages of various weights thrown upon the rural carrier untimately to deliver to the farmer, the question of the kind of roads that it is to be transported over becomes at once of paramount importance to the Postoffice Department and to the Federal Government, and when we consider the short time that the Parcels Post system has been in existence and the remarkable way in which the people seem to appreciate it and to take hold of it, it looks to me as if it was only a question of time when that service alone will assume dimensions that startle the imagination, and that also brings up with renewed force the active, real business interest which the Federal Government has in the question of good roads throughout the United States.

Then there is another reason why we ought to give a little consideration to the expediency of Federal co-operation, and that is, the powerful incentive which Federal aid would furnish to the poorer states. Pennsylvania is one of the greatest Commonwealths in the country; she has been described as an empire in herself and our people can borrow fifty million dollars and appropriate five or six million dollars a year and not feel the burden. But when you take states like Mississippi and North Carolina and South Carolina and other sections of the country which do not have the resources that Pennsylvania or New York possesses, an appropriation from the Federal Government, which would be met by a similar appropriation from the State, would furnish a powerful incentive to those states getting in on the line of progress, and, as American citizens, we are not only interested in good roads in Pennsylvania, but we also want them all over the country.

Now, as I say, this Joint Committee has had before it the Highway Commissions of a great many states of the Union. We have had hearings, have met from day to day in Washington all through the winter, and we have had a large force of experts on the work connected with the National Department of Agriculture, and have got in one of the volumes that you will find here quite complete data regarding the road situation in all the principal civilized nations of Western Europe. And before the Commission is through, I beleve, and I say it modestly, because I happen to be a member of it, I think the Commission will be monumental in the character of its report; and with the data which it will collect and the suggestions which it will make, will be one of the greatest contributions which has been made to the good roads uestion in the United States. (Applause.)

Senator Bourne, of Oregon, formerly United States Senator from Oregon, and Chairman of the Committee on Postoffices and Post-Roads for a number of years, succeeding myself, is the real author of the present Parcels Post system, which is an ingenious proposition, carefully worked out, reflecting great credit on his industry and continuous labors, and he is devoting all his time to working out this subject of good roads intelligently and laboriously. He had fully intended to come out here today to open up before the people, not only of Pennsylvania, but of all the United States, his ideas on good roads and the tentative suggestions made to the Good Roads Commission, and it was with great regret that he found that illness prevented him and it was greatly to my regret that I could not have him here to talk to you about a subject with which he is necessarily more familiar than I am, because he has had nothing else to do for some months but devote his attention to this one important subject.

As a member of the Good Roads Commission of Congress, I am not committed to the suggestions to which I shall refer in a few moments, presented by the Chairman, Mr. Bourne, to the Committee, as to the nature and extent of Federal co-operation with the different forty-eight states of the Union, and doubtless Mr. Bourne will be only too willing to modify many of these views, particularly as to the details which he may have therein after the discussion develops the subject. But the suggestions made are certainly worthy of serious consideration and they have the great merit of bringing up the whole subject in tangible form, so that the people of Pennsylvania and the people of the United States and the American Congress will have something tangible to debate, criticise and discuss, and it may be that someone will come along with a better plan, but this will furnish the foundation for the discussion.

The essence of the whole proposition is, a loan by the Federal Government of, say, a billion dollars, an apportionment among the states of the proceeds of the loan to be paid the states from time to time as they raise equal amounts, the money to be expended under the jurisdiction of the State without undue interference from the Federal Government; but at the same time with the Federal Government maintaining a general Federal supervision. A Bureau of Standards, for instance, to fix the character of the roads in different sections, a staff of engineers to advise and consult and supervise, but not in an offensive way to interfere with the jurisdiction of the State.

Now, under that proposition, briefly and crudely outlined, because it would be foolish for me to go into the financial and technical details in this general meeting, when the full report is available for anyone who chooses to examine it more fully, but under this general plan, the share of Pennsylvania out of the proposed loan would be $56,000,000; that is to say, if the State of Pennsylvania authorizes the loan, gave the authority in a constitutional amendment for the State government to borrow $50,000,000, this State can get $50,000,000 from the Federal Government, and if that authority extended to $56,000,000, we would get $56,000,000.

That is a proposition well worthy of serious consideration. The States get different amounts, achoring to four factors that are considered of equal account in estimating the quota to which they are entitled. Those four factors are: Actual mileage of roads in the State, population, assessed valuation of property and area. These are the four factors, and on that basis a state like New Hampshire would get about, I think, $5,000,000; a state like Alabama would get about $11,000,000, and Pennsylvania would get about $56,000,000. Area is a factor; mileage is a factor; the population, of course, is a factor, and assessed value of the property is a factor, because the property must bear the State tax, which will be applied to the State loan.

Now, if any such proposition like this should come along, it is well worthy of thought and consideration by the people of Pennsylvania when they come to vote on the question of authorizing the borrowing of $50,000,000 by the State. Of course, many people maintain that roads can be built out of current revenue, and that is true. But we will all be in our graves and our children after us, before we get a complete system of roads out of current revenues, and I am one of those who would like to anticipate the future a little and enjoy some of the good things due to this generation during the lifetime of the generation. If we borrow the $50,000,000 and get the $56,000,000 from the Federal Government, we can practically cover the State of Pennsylvania with good roads. I do not mean through routes for automobiles or for pleasure seekers merely, but good roads all through the country that will enable the farmers of the State to carry their products to the nearest railroads and to the county seats and other places where they want to deposit them.

Our forefathers did not hesitate to anticipate the future. They borrowed what was in those days enormous sums of money to build canals or to aid railroad companies construct railroads, because they realized that good roads and transportation was the life of the nation; in fact, the early days of 1810 and 1840 are largely taken up with the history of the construction of canals and the promotion of railroads. The people were enthusiastic almost to the point of madness, in some cases, to have railroads and canals everywhere all over the United States, and we can well afford, in this generation, with the State of Pennsylvania absolutely out of debt and with the debt of the Federal Government practically of no account, in view of the enormous resources of the country, we can well afford to borrow the money for the National Treasury and for the State Treasury.

The conditions that the loan is contemplated for are also set forth in the report. One of the most important, the two most important provisions are that the State should have a Highway Department and that it should have the ability to borrow the money. Now we have the Highway Department, and in my opinion we have the Highway Department presided over by one of the ablest engineers in the United States, Mr. Bigelow, present Chief of the Highway Department. It is not theory about Mr. Bigelow. He was for a very long period the Director of Public Works in the City of Pittsburg, and you have only to look at the Grand Boulevard, Schenley Park and other improvements, all due to his ability and farsightedness, to recognize that in him you have a great demonstrator and a capable engineer, and if his health is preserved and he is able to take care of this work in Pennsylvania, I, for one, shall feel confident that it is in good hands. We have the Highway Department, and now it only remains to act on this resolution to be submitted to the people at the next election as to whether the State shall be authorized to borrow the money.

Now I do not mean, and I know a great many of the farming people and the State Grangers, have an idea that this means entering or a carnival of lavish expenditure, but no one imagines that this money is to be spent in a week or in a year. It might take twenty-five years to spend the money, but we want it authorized; in fact, the proposed suggestion of the Committee, the Federal Committee, is that no State should be given more than 20 per cent. of its quota in any one year and if it is thought that even that would lead to extravagance, it is easy to reduce it to 10 per cent., but the authority must be there and able to have the money available as cash may be required.

There is no more proper spot than this Borough of Washington for a Good Roads Convention. It is needless for me to say what you all know, we passed over it this morning, part of it, that here one of the greatest feats of good roads engineering and the earliest, also, in the United States, the Old Cumberland or Washington National Pike was inaugurated, and in the opinion of many people, there was no material structure in all the land that did more to harmonize the country and it has even been said, to preserve the American Union than the construction of the National Pike westward to the Mississippi. (Applause.)

That is an object lesson and we do not have to go any further than this beautiful and substantial town here and study the history of the great National highway that passes down one of its main streets, to be fully alive to the importance of good roads and transportation. It is estimated that the saving in the wear and tear, in equipment of wagons and horses and all the elements that enter into transportation over roads, would pay three per cent. or nearly $4,000,000,000. Well, if that calculation is anywhere near correct, the Federal Government could easily afford to borrow, not $1,000,000,000, but

$2,000,000,000 or $3,000,000,000, and save the farmers of the country and the rural carriers and travellers in general, the wear and tear on equipment and the delay in carrying products over the roads. France has spent in 150 years a billion dollars and a half to construct good roads. My recollection is that France has in the neighborhood of 340,000 miles of good roads and in that great republic there are ver 70,000 patrolmen walking the roads every day, keeping them in repair.

Of course, the problem in America is immeasurably greater, but it is not too great for the wealth and genius of the American people to meet. The question of good roads has always entered as a vital question in the prosperity of the community. A city becomes commercially great on account of transportation facilities, and to take them away or deflect them, the walls decay and buildings fall to pieces and commercial supremacy leaves the town.

The history of the country is wrapped up in the question of roads. We recall how in the early days we read about the great paths or highways which the Indians had all over the Continent. They went up the Hudson, and up the Mohawk, and across the watershed down to the Great Lakes, and crossed the watersheds of Ohio and Indiana among the mound-building Indians of the Central West, and we have remnants of them today, and in many cases the railroads followed the routes laid down by the original settlers on the Continent. And then we have the routes made by the great game animals, especially by the buffalo, who, in his migrations, curiously enough, instinctively, in crossing the mountains and in selecting the fords over the rivers, selected in the course of ages routes to which he adhered as scientifically laid out, apparently with a view to grades and acclivities and shoals across the fords, as could be selected by the most skillful engineer graduating at Washington and Jefferson or any other college in the land, and these routes have, in many cases, been adopted by the railroads and by those laying out highways, and are today the same routes are traveled by civilized commerce that were once traveled by the buffalo and the Indian.

Then, as we go on in the history of the country, we record the great roads which passed in this vicinity, the road known as Washington's Road, or, I believe, named for an Indian chief, Nemacolin's Path, Braddock's Road and the Old Glade, or Forbes' Road. And then, after the Colonial days, showing how identified the road question is with the history of the country, we recall how Boone's Wilderness Path took the immigrant, the hunter first and the missionary, and then the immigrants seeking new homes, into the western country and the conquest of the West follows the line of Boone's Wilderness Road and the great military roads later on built by the Government in the Mississippi Valley. And so Pennsylvania, if these roads were constructed, would reach a higher point of civilization, and there would be a cheapening of the cost of living of everything than we consume and a perceptible lightening by a decided percentage in the labor of men within the Commonwealth, if good, clean roads, free from monopoly, open to all, rich and poor alike, covered the hills and valleys of this great State.

There are other reasons which forcibly impress us with the necessity of good roads. There is no State in all the Union richer in historical suggestions than in the Commonwealth of Pennsylvania. If we had good roads these wonderful places would be thrown open to the traveler from all over the United States and they would come from the West and from New England to visit the beautiful scenery and the historical spots in Pennsylvania, as tourists and as travelers, instead of going and spending their money, as many of them do now, in foreign lands. There is no State in all the Union that is richer in historical associations than is our own. Here, at the head-waters of the Ohio River, was fought one of the great battles near the City of Pittsburg, participated in by George Washington, and where Braddock was slain in the French War, which decided whether the Latin race or the Anglo-Saxon should dominate and control the American continent.

That certainly is a significant point that every patriotic American would like to visit. And on the other extreme of the State, as you know, we have Independence Hall, where the Declaration of Independence was declared, and where our country established its independence and freedom. And within its limits is that great field where the high-tide of the Rebellion was stopped and where the Union was saved. I refer to that military field at Gettysburg, the fiftieth celebration of which will be celebrated in July, a field upon which millions have been spent to mark the points where those heroic men fought and died. Why, people spend hundred and thousands of dollars to survey the Battlefield of Waterloo, to see nothing but grain fields and corn fields. But here every line for twenty-five miles of a great battle, one of the battles of the world, is marked out at an expenditure of millions of dollars. And if that wonderful and beautiful and sacred point was made accessible, thousands of people would visit Gettysburg every year to renew their patriotism by surveying that wonderful scene.

Every valley and hill and mountain in Pennsylvania is filled with historical associations of notable or important events, and while these are perhaps, sentimental reasons and getting a little away from the main issue, yet, after all, they are real, and business and commerce and patriotism all unite in making the American people stand together and work zealously and consistently until Pennsylvania and the whole country is covered with a system of good roads.

The work has been begun in a great many localities and great success has been achieved. It is evident to anyone who travels over Pennsylvania that decided progress has been made in the construction of good roads. I noticed coming along from Pittsburg this morning in the trolley car the excellent brick roads in many parts of Washington county. Every mile of improved road is an education to the farmers and the people living in the vicinity. It is only a question of a short time, after looking at the miles of good roads, that they will insist on having every part of the road improved and good.

I am glad of this opportunity, ladies and gentlemen, to meet you here today. This county is one of the greatest in the State, with its varied industries, its fertile farms. everything on the surface and every kind of wealth under the surface, for the use and the enrichment of man. And if I have been able to enlighten you on the Federal phase of this question, and if the results shall be that the people of Pennsylvania will advance in steady progress to bring about a condition of good roads in the country, I, as a patriotic Pennsylvania, will rejoice as much as any of you. (Applause.)

The CHAIRMAN: Now friends, we have two or three other speakers whom I would like you to hear. In making up this program, Mr. Martin has desired that our Commissioner of Roads be with us today. We have with us a representative of the Highway Department of Pennsylvania. We had hoped to have Mr. Bigelow with us, but he is not well; he is confined to his room and it is impossible for him to be here. I had hoped that he would be able to meet you. I would just like to give you a little history, just a word.

Before he accepted the position, after it had been offered to him, he asked me the question, "What do you thing, George, of my accepting that position?" I said, "Mr. Bigelow, you have made your mark in making roads in Allegheny county, and your name will go down into history. You are undertaking the biggest job ever offered to any one man in the State of Pennsylvania. If you wish to go on and try to make a new record the field will be open to you." And I believe that if he lives and has the opportunity, he will bring great results in this Commonwealth of ours. He cannot be here today, but he has here a representative, a gentleman who graduated from this good College that we visited this morning, a civil engineer of Statewide reputation. The only thing I can say about him is that he gets disappointed sometimes when State College defeats their football team. He kind of loses his nerve then, but I know he will not lose it this afternoon and I take great pleasure in introducing Col. Foster, Chief Engineer of the Highway Department, who will speak to you on how to construct roads or the construction of roads.

Colonel Foster spoke as follows:

## ROAD CONSTRUCTION

By COL. S. D. FOSTER, *Harrisburg, Pa.*

Mr. Chairman and Members of the Institute: I want to bring the greetings of Mr. Bigelow to you. He had expected to be with you but illness at his home causes his absence.

In taking up the question of good roads, I am going to confine myself to the Sproul Road Bill, the operations of the Department and the road construction which they will maintain in the State. Our Department came into being through the Sproul Road Act, the first of June, 1911. It consists of the Commissionr, Mr. Bigelow, Mr. E. E. Jones, the Second Deputy Commissioner, Mr. Joseph W. Hunter, the other Commissioner, and various assistant engineers of roads and bridges. The State, after Mr. Bigelow had accepted his position, was divided into fourteen districts. Over each district was placed an assistant engineer. This Act directed us to survey 296 routes. These routes have been surveyed and we find, instead of 8,000 miles, which was contemplated in the Bill, a total of 8,800 miles of road. In this State, there are 90,000 miles of road all told, giving the Highway Department control over about one-tenth, of a little less than 9,000 miles. We find that of this 9,000 miles, about 850 had already been constructed, some by County Commissioners, some by the State Highway Department and some by the Township Supervisors.

Since the inauguration of Mr. Bigelow's administration in the Highway Department, 196 miles of road have been completed. There are at present under construction about 140 miles. These roads are of several different types, according to the traffic and according to the locality in which they are. We are building today four types of road. In the rural communities and in the parts distant and lightly traveled, a plain, macadam road; this road is built from the native stone, if it is hard enough, and we find in quite a few of the counties, proper stone for the construction of these roads. As we near the communities of a little larger size, it has been necessary to add asphalt or some dust layer to these macadam roads. Closer in and on roads where there are no grades, we have placed a concrete foundation with an asphalt concrete top. This road, I believe, will last for twenty or twenty-five years if properly taken care of. In the communities near the boroughs connecting cities, we have built brick roads; this, in communities where we have extra heavy travel, that is, travel of an extra heavy nature. These brick roads we calculate to last twenty or twenty-five years. The roads which we constructed during the last two years have cost on the average about $16,000 per mile. In some of the counties, like Centre, Cambria, Blair, Berks and a dozen others, we have limestone. In these limestone counties, we can construct roads and have constructed them with our own forces as low as $3,000 per mile. It is the intention of the present administration to construct roads in this county of limestone, inasmuch as they can be renewed completely for less than a permanent road of asphalt or brick would cost in the way of interest.

In taking up the maintenance question, the Department was charged with the maintenance of these 8,800 miles of road on the first day of June, 1912. The Commissioner had fifty superintendents at his disposal, no machinery and no funds. Probably 90 per cent. of the 8,800 miles of road have not been touched by the township supervisors for at least 18 months. He had $3,000,000 in the Sproul Road Fund. He took from this fund $1,000,000 for maintenance. He had to go to the Township Supervisors and the County Commissioners and ask the loan of their machinery, because our Department had no money with which to buy it. That was one reason why last year there was more or less complaint on account of the dirt roads not being maintained. With the present year, the present Legislature, now in session, has recommended an appropriation of $1,800,000, $1,400,000 of which is to be used in the maintenance of the Sproul Roads, $400,000 of which is to be used in the maintenance of the State Roads, roads which had previously been constructed by the Highway Department and which the Township Supervisors in many instances have allowed to decay.

We have today, fifty Superintendents in the various counties, each Superintendent under him having a general foreman in charge of 80 or 90 miles of road. The 80 or 90 miles of road have been divided up and apportioned out to the various residents of the district for maintenance. There are at present in use in the Department in the neighborhood of 2,000 drags. 7,000 miles of the 8,800 miles have been practically rebuilt. The old dirt roads have been shaped up, have been crowned, drainage has been placed under them instead of over them, and a great many of the old stone roads which had been allowed to go to ruin have been resurfaced. We have today 50 road rollers working on our State roads. With each of these rollers we expect to carry through 8 miles of work during the present season, giving a total of probably 400 miles of reconstruction of these old stone roads.

On the maintenance force we have covered today and reshaped practically the entire distance, and I have myself traveled for a day at a time in the central and lower central parts of our State on dirt roads that were as good and practically better than most of our city streets. You men here who are Township Supervisors will be interested in what Mr. Jones, who is to follow me, will tell you in reference to this dirt road maintenance. We expect some day to have our Superintendents, men to whom you can go for advice as to all the ills that you have in your township. When that day comes, I think, instead of having 8,000 miles of road, we will have 90,000 miles of road, over which we can travel for six to eight months of the year in perfect comfort. I think, Mr. Chairman, that is all I have to say.

The CHAIRMAN: I now have the pleasure of introducing to you a getleman who comes from the northeast section of Pennsylvania, from Susquehanna county, known to a great many of you as the home of great men; and the greatest I knew was Joshua Grow. He grew up in that country. But there grew up one after him who is trying to do his very best for the people of the State. He is trying to get an appropriation to help aid the townships throughout this Commonwealth. He has served for terms in the Legislature from his county. He is Chairman of the Committee on Roads; he is making it a study; he is giving the best efforts of his life for your benefit. He comes here today away from his labor at Harrisburg to speak to you a little while on the question known as "Dirt Roads." I have great pleasure in introducing to you the Hon. Edward E. Jones.

Mr. Jones addressed the Institute as follows:

## IMPORTANCE OF DIRT ROAD BUILDING

By HON. EDWARD E. JONES, *Harford, Pa.*

Mr. Chairman, Ladies and Gentlemen and Friends: I say "friends," for you look like my kind of people that I have lived among up in Susquehanna county. I think there are some of you here, perhaps.

At the outset of what remarks I may make I want to set myself right and set the cause for which I speak right, in correcting perhaps a misapprehension which is sometimes prevalent, that because we make a hobby of dirt roads we are in any sense opposed to the best type of roads which are being constructed by our splendid Highway Department today. I want to make that perfectly plain, that we are in perfect accord with the construction and the work that is being done along that line. You cannot build the roads any too well; and it has been my pleasure and privilege, as a member of the House, to stand for that legislation which we have in the Sproul Bill and other bills which have to do with the construction and maintenance of just such roads as our eminent civil engineer from the Highway Department has told you about today.

I want to make that plain for several reasons which will probably develop later. We want to get away from the word "dirt" road or mud road. They are pretty apt to say, "There is one of Jones's mud roads." We want to get away from the word "dirt" or "mud" and distinguish those roads by the name of township roads. You see, under the system which we are getting into shape in Pennsylvania, we have these 8,800 miles of main highways taken over by the State, known as State roads, to be built and maintained forever by the State itself at the expense of the State. Then we have the State Aid roads, which are built in connection with the counties and townships, the State paying one-half of the expense, the county one-quarter and the township one-quarter. Then we have 80,000 miles of road, which are maintained entirely or principally at the expense of the townships, as has been the case heretofore, but we want the State to help in the maintenance of those and the construction of those township roads, and I want to call them Township Roads here. And am very glad that our distinguished United States Senator has preceded me, and in connection with the remarks which he made as to the Federal Aid to the States, he spoke of how in some parts of our nation there are those States which are financially weak and unable to do for the highways in those states what Pennsylvania is doing for hers.

In other words, the idea is for the strong to help the weak and that is what we want. We want the great Commonwealth of Pennsylvania to help those of us who live in the sparsely settled districts where we don't have sufficient money to maintain or construct good township roads. Now these township roads may not necessarily, although under the supervision of the township, be merely township roads. In many parts of our State we have material, such as stone, in some counties lime block and other materials, to construct an inexpensive stone road or partially permanent road, which could be rightly termed an improved road by the township, and what money we get from the State we want to put into such kind of roads, with our native helpers to be paid by our native Supervisors and using our natvie material. So those are the kind of roads which we want to build under State Aid and why do we ask for State Aid in our township roads?

First, I want it, my friends, for the equalization of taxation. That is our principal argument in favor of such aid for these township roads. We base our claims precisely on the same claims that were made originally in asking for State Aid to our public school system. It is a parallel case precisely. We ask for the State to come in and help us in our rural townships in the construction and maintenance of our township roads, for the same reason that we asked the State to come in and help us in our public school system in providing better schools in our country districts; and the State appropriation for schools is not confined to high schools alone and to our colleges but the very smallest country school district receives aid from the State, and rightly, too; and for that reason we ask for State Aid for the country roads which are way back on the hillside, for the equalization of taxation; that is the principal reason. We don't deny that fact, that we ask State Aid for that reason, for we find, in consulting the reports of the Auditor General for the year 1910, that the aggregate appraised value of real estate in Pennsylvania for that year was four billion, six hundred and thirty-five million, five hundred and forty-seven thousand and some odd dollars. The taxes collected on that amounted to $77,346,540, or an average of a little over 16 mills. We find also in the same report that the appraised value of personal and corporate property in Pennsylvania was nine billion, two hundred and five million, eight hundred and forty thousand and some odd dollars, or, in other words, twice the value of real estate in Pennsylvania, and we find that this property paid into the State as taxes, $14,516,588, or in other words, about 3½ mills.

Now, in short, my friends, the difference is between taxes to the extent of 16 mills upon real estate and in round numbers, 4 mills upon personal and corporate property. It is true, that we who own real estate do not pay money directly into the State Treasury for taxes, but nevertheless we pay taxes, even if they are for our local support, for our local benefit; they are taxes upon our property and we feel that to help to equalize this great difference between the tax on real estate and the tax on corporate and personal property, that the tax on corporate and personal property should be increased to some extent, to an extent sufficient to revert back to the townships three million dollars or a million and a half dollars, which would provide about $20 per mile to the townships to help them in the construction of better highways in those townships. The principle is exactly the same as has been followed in the school appropriations, and we are asking for the same principle to be laid down now and become a policy of the State in its attitude toward the highways back in the country districts.

Then we have as another reason that the type of roads which we are now building and which are being constructed by the Highway Department at the present time, as described by Col. Foster, on the 8,800 miles which they are maintaining and putting in proper shape as earth roads, and all of you know about those roads, those roads extend all over the Commonwealth, they are putting them up in splendid shape, and that is an object lesson to us that we want our roads in that shape. But it is a physical and financial impossibility in many districts of Pennsylvania to raise money by taxation to fix our roads in that way. We want that kind of roads.

I will take, in connection with the system which was made as to the taxation of Pennsylvania as a whole, to corroborate that and to know that it was true, I took the pains to communicate with the Board of Supervisors in every township in my county; I put the question and got reports from them as to the valuation of their real estate and the taxes which they levied, and I got for the average of our county as follows: For roads the taxation in Susquehanna county, the millage is 12½ mills; for schools, 15½; for county purposes, 8; for poor, 4, making a total of 40 mills tax. I know that's a revelation to you who live in Allegheny county. I was down in Lancaster county some months ago and it was a revelation to them that these counties in the northern tier were so heavily taxed to maintain their local government. I want to be fair in this matter and that is to say that in the valuation of our property, it is only valued at half, at about half, the assessed valuation is about half, so as to be perfectly fair, we want to cut the millage in two to bring it down to 20 mills, so then to be perfectly fair we will bring it down to 20 mills. Susquehanna county is only the average county, and there are some worse off than we are and many much better off than we are, but it is an average county, and there is not a township in that county but what levies 10 mills for roads, the full limit, and then goes to our court and asks for an additional millage for the construction of roads.

Then we have another excellent reason, which is going to be more and more a good reason for State Aid, and that is that when we get these principal roads constructed, of a high type of construction, which we will have in a few years, especially if we can get the money to do it by this fifty million dollar bond issue, we all know that where there is a good piece of road we will drive out of our way for miles to get down to that piece of road and that means, of course, additional wear upon that road. If the township roads are improved, if they are made better, it is a matter of economy for the Commonwealth to assist those townships in making their roads better, so that those of us who live off the State highways will travel on our own roads and there will be less travel upon the State highways. This may seem a trivial matter, but it is not trivial, for every time a vehicle goes over a road you take some of the life out of that road, and it has been estimated by a friend of mine, and this thought came from this friend, who was Senator of Lancaster county; in his own words he claims that it will save the State on the wear and tear of its own State highways, a million dollars a year if we can have better roads back in the country, and we are only asking for a million dollars and a half.

Then another reason why we ask for State Aid is, that by the State giving financial aid to the townships, the State then has a right to come into the township and say to our township supervisors how they shall spend this money, not in a dictatorial fashion. And we have a Highway Department, which is organized, which is filled, or will be, in a few years, with competent road builders.

I want to say, my friends, that I think that considering the short time since the reorganization of the Highway Department, that the progress they made in organization is something wonderful, when you consider that Mr. Bigelow took hold of this work in this Department without any practical road builders and had to take green people who had no training as to road construction, had to take these men and make road builders out of them; the wonder to me is that they haven't made more mistakes than they have. But that is rapidly disappearing, because the men are being trained all over the State of Pennsylvania and you are going to have trained road builders. Why not let those men come into our townships and tell us how to do the work? They have the experience and the knowledge and we can get not only money from the State, but some of the gray mater from these people who know how and thereby assist us in the construction and maintenance of our township roads.

Another reason why we ask State Aid is, that this is the day of automobiles and they are everywhere over the State. The State taxes these people by a license; this tax goes into the State funds and is expended on the roads; yet these automobiles travel on all the roads of the State, they travel on our township roads and in a sense raise havoc with those roads. The State gets this money from the automobiles and we feel that some of it should be turned over to us to help us maintain the earth roads. Not only earth roads; we want them to be made of stone just as fast as they can be and want the State to aid us in this work.

There is one bill which has passed the Legislature recently and has been signed by our Governor, known as the Supervisors' Convention Bill, which, to my mind, will mean a great deal to the country districts of Pennsylvania. It provides for the holding of at least one annual convention of the supervisors of every county, either at the county seat or principal town, wherever they may choose, and that those supervisors shall be paid for attending that convention and that at that convention the county commissioners are to provide a sum not to exceed $175, to be used for getting to that meeting practical road men who will tell us how to perform our work, tell the supervisors how to perform their work and duties as supervisors, and thereby I believe that in a few years we will find that this one bill will mean the improvement of our township roads to a great extent.

Now, I am very proud to have been connected with this movement and to have done what I could, in a small way, these several terms I have served in the Legislature, toward the improvement of the roads of our Commonwealth. The time has gone past when any man needs to be argued with as to the benefit of good roads. We will agree upon that. I have seen the time when we had to argue that, but we don't any more. We all want them. The question is, how to get them and to get them as quickly as possible, in our own lifetime, as Senator Penrose said, we want to ride on these roads ourselves; we want to have some benefit from them while we live and our children after us should have some benefit and will have the benefit of it, but we want some benefit in our own generation, and I am very proud to be associated with the present administration in the State of Pennsylvania, with our Governor, whose heart and soul is back of this movement for good roads in Pennsylvania and whose administration will go down in the annals of Pennsylvania as the administration, which initiated and gave such a splendid start; and I hope not only a start, but before he ceases his duties as Governor of Pennsylvania, I hope to see many, many hundred of miles of the best type of roads in the State of Pennsylvania. I am very glad to be connected with that administration, with this movement and hope that we can connect up with that—take the next advance step and connect with that system the townships of our State, the township roads, the township supervisors, and connect them up with our Highway Department, and thereby have, to my mind, if I am competent to judge from the study of all the States in the Union as ta road construction, Pennsylvania will lead them all in the most magnificent system of public roads of any State in the Union

GOVERNOR TENER: Ladies and Gentlemen: I take it that this is more or less of a family gathering here, from the State point of view, and that the hard and fast rule which usually prevails in strictly parliamentary bodies will not be held against me for speaking twice on the same subject. But I am particularly interested in the object and the purposes of this meeting. True it is, as I said before, I am not a farmer, and yet, in my work at Harrisburg I come in close contact, not only with many of the farmers, but with all those things in an executive way that interest the farmer, and I want to know and would like to know just what has been discussed at this meeting. I would like to ask of you, Mr. Hutchison, or Mr. Martin, or the Secretary here, or Mr. Surface, if these gentlemen, coming from remote distances as well as those at home here, know just what is being done by the State for the farmer; how the Legislature is endeavoring at this Session, as it never did before, to meet the wants of the farmer? We all realize and we do not need to be farmers to realize that the happy-go-lucky way of running a farm in the old days is now out of date, and that you must at this time apply the proper scientific and sanitary measures and rules and all of that for the proper conduct and for the profitable conduct of your farm, and many farmers there are today, I am sure, who have not had the advantage of gaining that scientific knowledge, many of you have not been through State College, many of you have not had the opportunity of gaining all that, and yet that knowledge is at hand, that knowledge is free to every farmer and everyone interested in it in the entire State.

Up until this time, the Department of Agriculture was somewhat handicapped in disseminating that information, but now, with an appropriation and with a bill passed expressly for the purpose, today we feel that the State Government and all the Department of Agriculture means in helpfulness to agriculture and to the farmer, is at your disposal. You are familiar with the splendid work being done by Dr. Surface in his Department and its far-reaching and splendid beneficial effects, and today we are ready to carry that right to the farm, and so, if there be any trouble with your planting, with your crops, with your soil, with your trees, you have at hand at your call, free by the State, the expert who will come to your door.

I want to know if that has been discussed, Mr. Secretary, and if everyone here is perfectly familiar with that advantage which they now have? I would like to know if you have discussed, for instance, the State Fair proposition, which is recommended in my message and which was asked for by many of the farmers, although there is some opposition now by officers of local fairs, but I think that that opposition should not prevail, for the reason that the greater the fair, the greater the exhibition, the more people will come to it and the further its good influence will be radiated throughout the State. In other words, if you have a good State Fair in Pennsylvania, you are bound to have good local fairs, because the prize exhibits of that State Fair will go among these other fairs and all the things that are of interest and that are of benefit to the farmers in a real, practical, genuine way, the State Fair is committed to and is endeavoring to accomplish through the Agricultural Department and other Departments of the State.

I am asked at this time that the program be filled up and concluded by one who usually pronounces the benediction on occasions of this kind, a live wire from your adjoining county of Allegheny, one of the County Commissioners, who has had a very great deal of experience in road building and in contracting for roads. In that county of Allegheny, they have built almost entirely of themselves and with their own money, more than 400 miles of improved roads, and have within the confines of that county, by purchase as well as by construction, altogether some 500 miles, half as much, nearly half as much as the entire State of Pennsylvania. I take great pleasure in introducing one who is, I am sure, known to most of you, the Hon. J. Denny O'Neil, of Pittsburg.

MR. O'NEIL: Mr. Chairman, Ladies and Gentlemen, Governor Tener and Senator Penrose: I was one of the few fellows over in Allegheny county who made a hard fight for Governor Tener and I have never for one moment regretted that he was elected Governor.

GOVERNOR TENER: I want to remind the Commissioner that this is altogether a non-partisan gathering.

MR. O'NEIL: I can speak my mind freely, ladies and gentlemen, because the very last bill that Allegheny county was interested in, was signed by the Governor the other day, and when his term as Chief Executive of this State is over and he retires from public life, he will go down into history as one of the greatest Governors Pennsylvania ever had, and I say that from my experience with him as a public official and a business man and from several months' experience in Harrisburg trying to secure legislation that would be for the benefit, not only of Allegheny county, but for the benefit of the whole State of Pennsylvania.

I have absolute faith in good roads. I have the distinguished honor of being a member of the Board of County Commissioners of Allegheny county and that county contains one-sixth of the total wealth of this whole State of Pennsylvania. It is a county whose assessed valuation is greater than that of Maine, New Hampshire and Vermont combined. There are 18 states in the Union that have a lower assessed valuation than the county of Allegheny and from a county like that you can expect big things. We have at the present time 450 miles of roads that were constructed by our county. We have about 50 miles of roads that were toll roads and that have been taken over by the county and we have spent in excess of $11,000.000 to build those roads, and I want to say as a business man and as a banker, that it is the best investment that Allegheny county has ever made. I know farms in Allegheny county on some of our improved roads, that two or three years after we improved those roads, they not only doubled in value, but in some sections where the land came into use for residence purposes, the value increased ten times the price they sold at previous to the road being constructed. That is the best investment any community can make, because when you construct good roads in the vicinity where farmers live, you are going to retain those farmers and going to get a better class of farmers. Why, men, one of your own members here said that the future of this country depends upon the boys who come from the farms, and as a practical politician and as a practical business man and as a man who has had great deal of experience in our cities, I want to say that every word of that is true. Why, if it were not for the people who come into our city to balance us up and keep us in the straight path, if it were not for the farmers, God pity this great State and this great nation of ours.

Now, I am interested in good roads and I have had a good deal of experience and we hear some of the farmers complain about the high cost of constructing roads. We have maintained a steady road construction in every state in the Union and there are no other conditions that confront us when we go to build roads just the same as those in Pennsylvania. We have a peculiar soil, cut up by mountains and hills and rivers, and we have heavy traffic, and it is natural that our roads should cost more to build because we have got to build them better than in most of the states of the Union. In New Jersey, where they are building sand roads, or out in the West, where they take a road machine and round up the road in the center, it's no wonder they can build roads for $300 a mile; but in Pennsylvania, to build a road that will last and meet the requirements, you have got to spend from $14,000 to $20,000 a mile, depending on the construction of that road. But no matter what the road costs, it is the best investment for the people that they can possibly make. The form or type of road has been described by Mr. Foster and other gentlemen and I believe it has been said that we have practically arrived at the conclusion that the roads in the future must be on a concrete foundation in most places and in most sections. A macadam road will be built where the country is pretty well built up and a bituminous road in towns and in the vicinity of cities and boroughs. The construction of brick roads is another thing we have been greatly interested in and I have been going through the county and State to some extent, investigating it.

It is a strange phenomena to find so many farmers who are opposed to this bond issue for the construction of roads by the State. I cannot imagine why any farmer will reach a state of mind where he will go and oppose that project. I want to tell you, men, that when those roads are constructed they are going to be constructed and maintained by the corporations and it is right that they should be, it is right that they should keep up the roads of this State. As Mr. Jones has said, they have not paid their just proportion of the taxes and if we construct these roads and leave the corporations to pay for them, you are going to benefit and it is going to equalize taxation. That will make it fair, and I tell you, if you would only come over into Allegheny county and investigate what the roads have done there, you will not be misled by what any farmer politician may say in regard to the construction of good roads. You will not only vote for the bond issue and good roads, but you will do everything you can to get your neighbors and friends to do so.

I have congratulated the State on having such an excellent Governor, and I want to congratulate the State on having such an excellent Highway Commissioner and such an excellent State Road Engineer as Mr. Foster. It isn't much wonder that they are good, because they were trained out in Allegheny county, and when they wanted a Highway Commissioner and an engineer to construct the roads, they came out there and took them from our county. I am glad they did, because they have got a bigger field to work in, and our not only good men, but have the ability to construct your roads right, and they are absolutely honest and everything they do will be open and above board and for every dollar they spend you are going to get a dollar in value in the roads.

I don't know of anything else I could say to you, gentlemen. I believe you understand the conditions better than we of the city, but don't be misled by any story, no matter from what source, that the farmers ought to oppose this fifty million dollar bond issue. One of the reasons why they have been opposing it in the past is the false impression among so many that all politicians are dishonest. I am not a politician, I am a business man, but I have held political offices and have come in contact with the politicians of this State, and they will average as high, if not higher, than any other class, and it is a shame and will result in evil to our county if we do not stop this unjust criticism, particularly on the part of the yellow journals, this criticism of every man who holds public place. There are papers published in this State that are a menace to the State and the nation, and the citizenship of Pennsylvania ought to rebuke the stories sent broadcast in an attempt to tarnish the name and reputation of every man that holds a public office. If you compare the public men that I know with the men who are the authors of those stories and the publishers of those papers, you will find that there is no comparison at all between them. Some of those fellows are so low down, so degenerate, that I will not say what I think about them; you can imagine the rest.

The CHAIRMAN: I tell you, when a man strikes Billy Sunday's trail he just goes all over him.

Now friends, we have had here a feast of good things on this road question, discussion that will affect not only the audience present here today, but will go out all over this Commonwealth and this nation. We have taken a step forward in this important work. We've got a good friend here that's my boss, but I am his today. When he gets a chance he takes a whack at me. Now, I just want my good friend, one whom I love and esteem, Secretary Critchfield, to say just a word at the close of this meeting. Give him your close attention. He is a farmer from Somerset county, the place where yesterday or the day before, he stated it was a land overflowing with milk and honey.

SECRETARY CRITCHFIELD: When I was coming up the road day before yesterday, I heard two gentlemen talking about some of the products of this section of country and became very much interested. One said to the other, "How much are you getting a gallon for your maple syrup?" and he said, "Seven dollars." Well, then I became still more interested. I thought here is the greatest market for Somerset county that has ever opened anywhere, and I listened intently. They were sitting a little distance from me and then one of the men said, "That is, when it is bottled in Bond." And then I began to realize that they were taking the names that we apply to our good things and applying them to some other things in some other sections of the country.

Now, I am glad to have this opportunity to just say a word at the close, because I want to answer the very pertinent question that was asked by the Governor. The Governor told us at the outset, when he began speaking, that he was not a farmer and didn't know that he ever would be. If I had not already known that he was not a farmer, I would have known it after he said he would like to know whether the farmers knew what the Legislature was doing. I want to say to you that there is no class of citizens in the State of Pennsylvania or any other state that keep as close a watch upon their representatives in the Senate as well as the General Assembly, as the farmers. And I will venture to say that there is not, from Susquehanna, away off to Greene county in the southwestern portion of the Commonwealth, a farmer to be found, but what can tell what is going on at Harrisburg today.

GOVERNOR TENER: Wise man.

The SECRETARY: Thank you. However, to answer your question further, there has been nothing said with relation to these matters in this meeting. We have had the program to follow out and one of the items in the program, I am not sure whether it was mentioned in the printed program, was the appointment of a Committee on Resolutions, and if the men who have not been doing their duty in the State Legislature or the National Congress, escape that Committee, they will do well. There is no question but what the Committee on Resolutions will give expression to the sentiment of this meeting with regard to what has been done by the present Legislature. We appreciate, and I know I am voicing the sentiments of all here, which will be expressed by the Committee on Resolutions —I know I am voicing their sentiments when I say that we not only know, but we appreciate beyond expression what the General Assembly is doing for the farmers of the Commonwealth and what your Excellency has been pleased to give your executive approval.

It has been a very great pleasure to me to be here and I have been more interested than I can tell you in listening to these excellent addresses on this topic that is so full of interest to all of us. I shall go away with very pleasant recollections of this meeting and the opportunity it has given me of renewing acquaintance with some of my old associates in the agricultural work of western Pennsylvania. I want to say that, before the adjournment, I hope you will give an opportunity to one of the attorneys of the town, Mr. Eagleson, I believe, who has a word to say in behalf of the Reception Committee of this City.

The CHAIRMAN: I want to say to the Governor that in the beginning of our session, when the Board of Agriculture met, we discussed and were very thankful to you for signing the Pure Seed Bill. It is a measure that took six years of hard work, as Mr. Jones knows, to get through the Legislature, a bill of the kind that you have signed, and they have been very thankful to you for it. Now I want to thank these good people of Washington county for the interest they have taken in this meeting, and to you people who have come out here today to favor us with your presence and listen to these good addresses on this great subject that lies so close to the hearts of the people of this Commonwealth, I hope you will take the message home with you and discuss it among yourselves, you Institute people, you gentlemen who go out as instructors, that you will go out as upholders of good roads throughout Pennsylvania and will do your part. I see the concrete people here and I hope they will go out and say a word for Pennsylvania; some of you come from Iowa and other places, but you will see we are awake on this subject. Now we will have a word from the Chairman of the Local Committee here, Mr. Eagleson, I believe, is the name.

MR. EAGLESON: I haven't much to say, except to say that the Automobile Club of this town and the Country Club, who are interested with the Convention delegates and so on here in the question of good roads, are willing to help out in this matter, and this evening, when we have our distinguished guests here, the Country Club has extended an invitation to Governor Tener, Senator Penrose and those with him here, to take dinner at the Club this evening at six o'clock, and have provided automobiles to take them out. Immediately after the dinner, we have also endeavored to have a number of automobiles here at the Court House, to leave about seven o'clock, and we extend an invitation to all of you to come out after dinner and receive. We are sorry we cannot take you all out there for dinner, but the conveniences are not such that we can do it. We want to take a number of the delegates to the Country Club and wish you all to come. Those we could not provide automobiles for and who wish to come, can take the trolley car at seven o'clock and get off at the Club, and we would like to have as many as possible come out to the Club about seven o'clock and meet the Governor and those with him.

The CHAIRMAN: Director Martin has a word.

DIRECTOR MARTIN: Now my friends, you have observed during the discussions to which you have listened during these two or three days, that I have been a silent listener, edified and instructed along the lines of highway improvement. Now, at the hour of closing, honored as we have been this afternoon by a visit from our good Governor and our Senior Senator and these gentlemen who have come from near and far to honor us with their presence,—now, as we close, I invite the audience, our county managers, our lecturers and others, before they leave the house, to come up and give these honored visitors the glad hand of welcome.

A Member: Mr. Chairman just before you close, I would ask whether it would not be well if the Committee on Resolutions couldn't be ready to report at the close of the night session?

DIRECTOR MARTIN: The Committee on Resolutions will offer their report at the opening of the evening session.

(The meeting then adjourned, afterward the audience formed in line and shook hands with Governor Tener and Senator Penrose.)

Washington, Pa., May 22, 1913. 7.30 P. M.

Mr. A. J. Purdy, Imperial, Pa., Chairman.

The CHAIRMAN: The first thing in order this evening will be the report of the Resolutions Committee.

MR. JOEL A. HERR: Before the Committee on Resolutions reports, I would like to offer a resolution.

The CHAIRMAN: Just hold it, please, until after the Committee reports.

MR. JOEL A. HERR: I think perhaps it should be placed before the Committee and if they want to incorporate it in their report, they can do so. Their report is final. I don't want to make a report after the Committee has reported.

The CHAIRMAN: Well, perhaps their resolution would cover yours.

MR. JOEL A. HERR: Well, if it does, all right, but mine should in any case be referred to them.

The CHAIRMAN: We are ready for the report.

Prof. Menges, Chairman of the Resolution Committee, then read the report, as follows:

## REPORT OF COMMITTEE ON RESOLUTION

1. *Resolved,* That we, the State Board of Agriculture and the Farmers' Normal Institute do hereby express our hearty appreciation and extend our sincere thanks to the committee of citizens who have arranged for our comfortable entertainment during our stay in this city; to the Board of Trade, for furnishing us with the commodious hall for holding the sessions of this Institute; to the Agricultural Society for throwing open the Fair Grounds for our visit; to the Street Railroad Company for transportation to and from these grounds; to the Grange of this county for the part taken in arranging for our comforts and to the Press of this City for its full and well written reports of the proceedings of our meetings.

2. *Resolved,* That we congratulate the Department of Farmers' Institute in obtaining, and that we thank the Legislature for passing, and the Governor for signing, the Bill appropriating $40,000 for the employment of demonstrators and councillors to apply with the farmers, the best approved practical, scientific methods of agriculture, horticulture and in the application of the various activities of the dairy and animal husbandry adapted to the various climatic and soil conditions of the State; and further, That we earnestly solicit the co-operation of the County Chairmen of Institutes and farmers generally, in assisting the Department and the demonstrators in the development of this work. Resolved, That we earnestly request the support of the Legislators of the various counties for a

further appropriation of $55,000 for the maintenance of the Farmers' Institute for the coming two years.

3. *Resolved,* That we herewith express our appreciation of the honor conferred upon us by the presence of the Chief Executive of the State, Governor John K. Tener, and the Senior United States Senator, Hon. Boies Penrose, and the pleasure of their excellent and instructive addresses. Further, That we commend the action of the Governor and the legislative bodies for their generous support of agriculture of the State. Further, That we endorse the attitude of the Governor towards the creation of a State Fair, believing that such action will more rapidly advance agriculture.

4. *Resolved,* That we recommend as speedy a construction of Post Roads, permanent highways and earth roads throughout the Commonwealth, by means of Federal and State aid, as is consistent with good finance and good government.

5. *Resolved,* That in view of the present local and national agitation for the inauguration of co-operation among the farmers, that we endorse the establishment of a bureau to assist this movement in the National Department of Agriculture, and that we urge our own State Department to obtain, through its own initiative and through the assistance of other available agencies, such information as may be of assistance to the farmers of the State, in enabling them through their local organizations to form business relations with consumers' associations so as to sell directly to these organizations, and with the manufacturers of farm equipments, so that the local organizations may buy directly from the manufacturers and eliminate all unnecessary intermediate buying and selling agencies.

6. *Resolved,* That we endorse the movement for the enactment of a law by the National Congress, permitting the loaning of the postal savings deposits, now deposited with the national banks at two per cent. to farmers up to seventy per cent. of the selling value of real estate and sixty per cent. of the selling value of crops and livestock; with a long time mortgage as security for the real estate and with such security as may be deemed necessary for the absolute safety for loans on crops and livestock at the rate of three or three and one-half per cent. interest.

Since it has pleased the Ruler of all things to remove from our midst, by death, two of our most estimable and valued County Chairmen, Mr. A. D. Holman, and Samuel McCreary, be it

7. *Resolved,* That the State Board of Agriculture, the County Chairmen and Farmers' Institute Lecturers have sustained an incalculable loss.

*Resolved,* Also, that a copy of this resolution be spread upon the minutes and a copy sent to the bereaved family.

Whereas, Real estate is paying more than its just proportion of taxes and it is proposed to still farther encumber the State with a loan of fifty million dollars for the construction of roads, while we favor good roads and their maintenance if the money necessary were judiciously applied, we are not in favor of the proposed loan until means are provided by which our revenue can be increased without inflicting still higher taxes upon the public.

And, whereas, After diligent inquiry it is found that notwithstanding the condition of our highways during the passing century, the farmers have been successful in marketing all their products until this time and bring to the farm all the supplies required, so there remains a very small per cent. of any crop that is seeking a market at this time.

8. Therefore, be it Resolved: That we are unalterably opposed to encumber future generations with a debt that is unnecessary and uncalled for at this time.

Franklin Menges,
J. H. Schultz,
M. E. Conard.
Committee.

MR. HUTCHISON: I ask to have the report amended in two little items if the Chairman will agree, and that is, that the press, not only of this town, be thanked, but also the press of the State, which has been sending out the reports to different sections of the State; and that you include the Hon. E. E. Jones and Col. Foster in that list of gentlemen who came here to speak to you.

PROF. MENGES: I will be glad to accept those amendments.

(It was then moved and seconded that the resolutions be adopted as read)

(On motion, the resolutions were adopted as a whole)

DIRECTOR MARTIN: Mr. Chairman, there was an action this afternoon, calling for a committee to take under consideration the formation of a better plan for advertising Farmers' Institutes by the County Chairmen. We would appoint on this Committee, Mr. G. F. Barnes, of York; J. Aldus Herr, of Lancaster; H. G. McGowan, of Berks; S. S. Blyholder, of Armstrong, and Matthew Rodgers, of Juniata.

The CHAIRMAN: Is there anything further to come before the meeting?

DIRECTOR MARTIN: I don't know of anything, Mr. Chairman.

The CHAIRMAN: If there is nothing further, we will now introduce to you Mr. Wittman, who will give us a talk on poultry.

Mr. Wittman spoke as follows:

## SOME PENNSYLVANIA POULTRY HOUSES, GOOD AND BAD

By W. THEO. WITTMAN, *Allentown, Pa.*

Two months ago, when I first knew about this, it happened that I had a lot of work on hand and could not pay attention to it until a few weeks ago, and I haven't seen a single one of these slides on the screen, but I hope they will turn out all right and that you will like them. I had absolutely no material. When I had the fire at Mount Gretna I lost all the pictures and even my camera and whatever pictures I have had since were used in articles sold to various papers, so I had to start from the very beginning and these are all new pictures and I haven't seen any of them on the screen.

We will have the first one now. One way of getting these pictures was by getting a team and getting right out in the country and getting farm poultry. That was the very first chicken house we found. That is within a mile of Allentown. That is a very fine farm. Right across the street from this old chicken house there is a magnificent barn with a herd of wonderful Holstein cattle and that's what that farmer thought of his chickens—an old hole. That is the next farm. That fellow had his chickens sleeping above the pig pen, a mighty poor place to have chickens. The conditions were very bad on that particular Lehigh County farm. We are going to hurry through these pictures. There's three men on to-night and we are going through very quickly. The next farm has a fresh air poultry house. The chicken business looked good to this farmer and I believe that house was open like that all winter. He had a curtain here, but he told me he had not been using it, and he had some splendid chickens, as you will see in the next picture. (The operator couldn't find the slide for the next picture). That's a Lehigh county farm. That fellow has a splendid place for chickens and has a beautiful sunny slope. The only objection would be that he has the chicken house between his own home and the public road. I would not think that was a good place. I would want my home the most prominent thing on the farm, but he had a splendid place for chickens, and while he had a lot of grass in his chicken house, he knew enough to take out that much, at least, in April, and things looked very good on that farm and that is quite a nice chicken house. That was a two-story chicken house on a Lehigh county farm. I took these all in one day. He had an entrance at the back and one over here. The upper story was not much of a success, he told me.

This is a barnyard. When we arrived at this farm, the barnyard was just full of chickens. Right over here is a pig pen. The pig pen was full of chickens and my own opinion is, that is a mighty poor place to have chickens, in the pig pen and on the manure pile. We chased them all off. One rooster didn't like it and he got up on the fence and crowed and crowed and tried to tell us fellows that we didn't know much about chickens, anyhow. He liked the old-fashioned way of staying on the manure pile. There's the picture I wanted to show you of that farm that had a fresh air chicken house. He had a splendid white Wyandotte and his house was well sheltered. made of cement, mostly. He built it himself and it cost him $64.

A Member: What size was it

MR. WITTMAN: He had a workshop on one side, 38 feet. frontage; he had some old material around the farm and did most of the work himself. This is one of his white Wyandotte roosters in the foreground. That farmer didn't have good looking chickens, they were all sick; if you can see what this means you understand why they were sickly. They were in a mud-hole; he put his chicken house in a hole. There was a splendid steel roof on this, but he had a very, very poor location. His chickens are always bound to be in poor health when confined in a mud-hole. There were lots of ponds of water standing around, not a bit of glass or anything likely to make poultry keeping a success. These are of Lehigh county farms, the pictures taken in April by myself and another gentleman. This is the interior of that two-story chicken house. We found it difficult to get interiors. We came to one farm where the chickens looked poor and we tried to get the interior. This farmer feeds his chickens on cobs. He had been doing that for a number of years. There was about a foot of corn cobs in that chicken house, mixed up with manure and dead chickens. The smell and filth was something fierce and I should like to have shown it on the screen to-night. This was a new building. These conditions were quite fair. I shouldn't like that slanting roof he had, but that was quite a sanitary and good chicken house.

That is a Lehigh county chicken house. That is 2 by 12 ft. in front and 9 in the back, giving us an average height of 10 ft. There was too much glass in it. This describes what I was trying to get at. This is the chicken a foot high, with a 10 ft. ceiling; it goes away up there. The area is equal to a 6 ft. man in a house with a 60 ft. ceiling. We men could not live in houses with 60 ft. ceilings. A 6 ft. man builds a house with a 9 ft. ceiling. That is the sort of house a man builds for himself, but he builds a house like this for a chicken. This is almost the limit, a foot chicken in a 3-ft. house. That had plenty of material in it for two or three good chicken houses. It is entirely too high. That was the only chicken farm we found that day. There were 1,200 chickens in that meadow, quite large ones already, but they don't show on there. It was getting late at night. It has not been very easy to go out into the country and pick out a whole lot of places. In the afternoon we could be where we should have been in the morning and vice versa. Some chicken houses we had no chance at any time of day to get a good picture. There was one farmer we met—we spied around looking for chicken houses and there wasn't any in sight; then it struck me there were no chickens either, and the farmer was watching on a bench and I called to him, "Don't you keep any chickens?" He said, "No." I asked him why. He replied, "I don't like them." "Why?" He said, "I don't know; there ain't any money in the chicken business, anyhow. The other fellow may keep chickens." I wish everybody that felt like him would quit keeping chickens. I said, "Brother, here's my hand, I wish there was a whole lot of farmers like yourself, who, when they don't like chickens, would quit keeping them and give the people that love chickens so much more of a chance.

The test of a poultry house is, Do the chickens live in it? There are very few pictures that I have—this is one of them. This is a fresh air chicken house in which you don't have to pen the chickens. There is no way of penning those chickens in there; they will stay in because it's got plenty of sunlight and fresh air and litter and scratching material and is a splendid home for chickens. If the house is right the chickens will live in it. That is a view of a chicken house of the same sort. That is the interior of that same chicken house. That is the same chicken house built in a long continuous row, by Dr. Robert Mead Smith. This is that same chicken house built in a long continuous row, and while the Doctor is a new man at the chicken business, he is one of the most successful poultry men in Pennsylvania to-day. That is some more of the same thing. This is an interior that happened to be good. We had great difficulty in getting interiors. We put down this curtain and got the interior of the Doctor's chicken house. He has a long carrier to carry the feed. This is the curtain. This is the sunshine againt it. This is home. It is one of my own home chicken yards and this picture was taken because there are eight white Leghorns out of 15 that made a record of over 200 eggs in one year. Every hen you see there laid over 200 eggs. You see lots of green grass and that is the only way to keep chickens, on green grass. Joseph Tolman ,of Rockland, Mass., invented the first fresh air chicken house. All honor to Tolman. There is a plan view.

I had some other plan views of chicken houses, but I shall not use them to-night. There is Dr. Woods, another Massachusetts man, at Spring Lake. You understand, down in New England it is pretty cold, yet they are strong on fresh air. This is wide open the year around. This is Dr. Woods' house in Texas. I found a few in Texas last year when I was down there. That is the Wittman fresh air house; you saw that a minute ago. There's one thing I like about this house, the sunshine in here. There's a streak of sunshine comes clean back to this corner. I don't know whether you can see it from there or not. We like that about that Wittman house, which the other fresh air houses do not have, every inch of floor covered with sunshine on the 21st of December. That's another fresh air house, the Gollet. I had a beautiful slide and dropped it and broke it and had nothing but this. Here is a chicken house that is nothing but a roof. This is the White Plymouth Rock Farm. It is a pleasure to go on that chicken farm and that is the sort of house they believe in down in New England—cold climate.

Now we are showing you a big Pennsylvania poultry farm at Newtown, Pa., a very successful poultry farm, one that has been in existence quite a number of years. It is a very large plant, just full of chickens. There is a laying house and here is another. Unfortunately, we tried to get too much on that picture. That is one of the laying houses, inside detail, a little closer by. This is a large commercial proposition. That is the interior of that same laying house. We got those White Leghorns when they were busy scratching. They never knew we were taking their picture. That is the incubator cellar in that same place, taken before the 2,400 8-capacity giant incubator went in it. There's one of their brooder houses over in New England. These are large Pennsylvania poultry farms. That's the interior of the brooder house where they start the little White Leghorns.

I am proud to say that's a picture of Montgomery county, the plant of A. J. Fels, a young man who ten or twelve years ago was just as poor as poor could be, didn't have anything, and to-day his name is known the world around. To-day there is practically only one man living that has as good White Wyandottes as A. J. Fels. When we got there he was away. There was a little boy there who happened to get in all the pictures. He was a very smart little boy. He told one thing that his papa wouldn't like to have told. We got around to one pen and he said, "That's Teddy, he's never been out; been in Madison Square Garden." "Does your papa sell eggs from that pen?" "No, but some men the other day offered him three dollars an egg of that pen and he sold some eggs." There's some of the colony houses on Fels' plant. You only need to pass the place to know it's a profitable plant. You see our little boy took to us and get in every picture. There's the farm, paid for by chickens. I understand Mr. Fels paid for all that farm out of chicken money. It is quite a good farm, quite a good looking place, as you can see by the picture.

Now, of course, in taking these pictures you come across a lot of good things. Here was a mighty good thing sent to me as a sample, a parcel post egg carrier and I put it in front of the camera and I think I got a very good negative. I think it is a good thing. That was a lucky snapshot; all different breeds have their own special types. The Polish have their own type and you see the Polish type there beautifully and superbly shown in that picture and you get that beautiful coloring with a green sheen to it. You see the green over here and how beautiful both the male and female come out, and I should give any amount of money, almost, if I could have a hundred different varieties of chickens as good as that. I would have something wonderful and superbly beautiful to me as a chicken man, because this comes out so green. That was very hard to get. Chickens don't like flashlights and the first wasn't good and they went up like a shot and we went in there three different nights, but they were on the alert. You can see the expression of this chicken, he was just about ready to go up in the air, but we got them before they got up. I want to say, "Good night and thank you for your attention."

The CHAIRMAN: Has anyone any questions to ask the gentleman? If there are no questions, we will next have a talk by Prof. Watts, Dean of the Experiment Station, State College, Pa., on "The Most Intensive Type of Agriculture."

Prof. Watts addressed the Institute as follows:

## THE MOST INTENSIVE TYPE OF AGRICULTURE

By PROF. R. L. WATTS, *State College, Pa.*

Profits in farming depend very largely upon the type of farming followed. In these days there is a great deal of discussion about intensive agriculture and many people believe that the greatest need of American agriculture is to practice more intensive methods. As a general proposition this may be true, although it is equally true that hundreds and thousands of producers would increase profits by following more extensive methods. This is especially true in the animal husbandry industry, which requires a larger acreage, in order to provide the necessary amount of feed for the stock. I am confident that our hill lands should be devoted more largely to grazing and that the rough, stony, broken areas could be utilized to good advantage in providing pasture for various kinds of stock.

Intensive agriculture, however, will become more and more important in this country as the population increases, and we will be required to produce more on an acre of land in order to provide adequate support for our increased population, within recent years, vegetable forcing has attracted special attention and Pennsylvania has seen a material gain in the amount of glass devoted to growing vegetables. It seems to me that this highly specialized industry affords special opportunities throughout the State of Pennsylvania because of our many unexcelled markets. This type of farming appeals to business men because production is much more certain than in the open ground where some conditions are uncontrollable at certain times. The greenhouse man, however, need have no fear about any of the discouraging conditions which affect crop-producers out-of-doors. For example, a heating plant is installed by means of which he protects his vegetables from frost and provides a suitable temperature even when the thermometer registers lowest on the outside. As the house is nearly all glass, practically the full amount of light is admitted. Again, the up-to-date greenhouse plant is provided with an abundant supply of water and with the over-head system of irrigation the vegetable forcer is not the least concerned about drought.

With this modern system of watering, it is possible to water large areas under glass at very slight expense. When insects become troublesome, he can use the sprayer or fumigate the house. Only a limited amount of soil is used and when this becomes infested with insects or disease germs it is sterilized by means of steam or formalin and in this way the soil is freed of pests that often destroy crops out doors. Hailstorms or hard winds damage the houses sometimes, but these losses may be covered by insurance. At the present time greenhouse men are securing larger profits perhaps than any other class of producers and as many of our Pennsylvania markets are not well supplied with forced vegetables it is well for our land owners to give this industry more attention.

The following factors should be considered in connection with the vegetable forcing industry:

(1) It is exceedingly important for the operator of a greenhouse to be in love with the industry. This is absolutely essential to success. He must be willing to work long hours at times and to make a thorough study of every detail. He must also be observing in order to determine and maintain the proper temperatures and atmospheric conditions for the crops at the various stages of growth.

(2) The location should be selected with great care. Ordinarily the houses should be located near the market to be supplied.

It is generally conceded that from an economic standpoint it is better to build the greenhouse in the suburbs of a town or city than to build at a remote distance and haul the produce to market. As the greenhouse will cover a relatively small amount of ground, it is not necessary to locate it in a remote distance from the market because of the high cost of land in a more convenient location. While greenhouse crops may be grown successfully in properly prepared soils of almost any type, it is universally conceded that sandy loams are the best for this purpose. These soils are easily worked, well drained and provide the very best conditions for the root development of all the crops which are usually grown under glass. A liberal supply of water must be taken into account as an enormous amount is required to produce greenhouse crops which are grown so close together. If the over-head system of irrigation is to be installed, it is also important for the water to be delivered with a pressure of at least 15 or 20 pounds to the square inch. The contour of the land should also be taken into account. Comparatively level land is always preferable and it is an advantage for the land to slope to the south or southeast. Protection from hard winds is desirable. This may be secured by means of wind brakes or perhaps the house can be located on the south or southeast side of groves or woodlots which will give the necessary protection. It is also worth while to take into account the character of the road leading to the market. Greenhouse products are very perishable and they should be delivered as soon as possible to the point of consumption.

(3) In the construction of greenhouses the following factors should be considered:

(a) Use first-class material.

(b) Employ at least some iron in the construction. Iron pipes and angle iron are largely used for posts, braces, gutters, etc.

(c) Place all heating pipes around the sides of the house and do not have any interior benches or concrete sides to solid beds. The large modern greenhouses for vegetable forcing are free from any fixtures in the interior of the house which will interfere with tillage and other operations.

(d) Build wide houses—not less than 25 feet and 30 to 40 is better. If to be used for tomatoes and cucumbers, provide a height at the eaves of not less than 6 1-2 feet.

(e) Provide a large door at one end of the house so that it will be possible to enter with a horse and cart or implements. Many large establishments are making use of regular farm implements in preparing the land for these special crops.

(f). Provide ample ventilation at the ridge. Many growers also consider it necessary and important to have ventilation along the sides of the house.

(g). Provide ample radiation and use hot water for heating, if possible. Some of the largest greenhouse plants containing five acres or more are heated by hot water rather than steam.

(4). Endeavor to employ labor that can be retained. A year or two of service under glass is necessary to train a man for the best work. The greenhouse growers can usually well afford to advance the wages of their employees sufficiently to retain them.

(5). Whatever the type of soil, it is necessary to incorporate a large amount of organic matter. This is usually supplied by the use of rotten manure. In the largest establishments it is customary to spread the manure broadcast over the ground in the house before plowing or spading. This is the most economical in every respect and should be more generally practiced. Some of the intensive and successful growers apply about forty tons of manure to the acre annually. This amount of manure, applied for several years, will put almost any kind of soil in the very best physical condition for crop production. It will add the necessary fiber and at the same time supply all, or nearly all, of the food needed by the various crops to be grown. Near the cities, horse manure is universally employed, although other kinds of manure serve the purpose very well.

(6). In order to control disease and insects, soil sterilization is almost universally practiced by extensive growers who have been in the business for several years. Of the two methods previously mentioned, steam is considered more valuable. It is merely a cooking process for the temperature of the soil is raised to over 200 degrees F. in order to destroy the various destructive pests. The steam may be admitted to the soil by the use of perforated pipes and this method is favored by many of our most successful growers. Another plan, used largely at Cleveland, Ohio, is to invert iron pans, which are usually about 10 feet square and 8 inches deep, over the beds to be sterilized and the steam is admitted through a pipe at one side or in the middle of the pan. The steam percolates to a depth of eight inches or more in the soil and if kept in one place for about an hour all injurious forms of life will be destroyed.

(7). In the management of greenhouses it is important to maintain uniform temperatures. Ordinarily a temperature of 10 degrees lower is maintained at night than during the day time.

(8) Fresh air is absolutely essential to success. Some air should be admitted every day, and during the warm months of the forcing season ventilators and doors should be thrown wide open in order to admit the greatest amount of fresh air. The forcing industry is almost an all the year round operation, for the first crop is usually ready in September and the last crop is not harvested until July. Too much fresh air can not be admitted early in the fall and in the early spring and summer. Full ventilation during the warm months is also exceedingly important from the standpoint of comfort to the workmen.

(9). Watering pots and even hose are no longer used extensively in the management of great commercial ranges. A very large percentage of our growers have installed the overhead system of irrigation which has been found to be highly satisfactory for all of the vegetables grown under glass. It is especially important to supply water very liberally during the late spring and early summer when the crops are maturing and require a large amount of soil moisture.

(10). In the forcing of tomatoes and cucumbers, practically all growers have found mulching a very satisfactory practice. The mulch is usually applied after the fruit is fairly well set and it is customary to apply about a three-inch mulch of fresh horse manure which has been aerated for a few days before using. This mulch serves several purposes, as

(a). It conserves the moisture of the ground better than any kind or amount of tillage.

(b). When applied in sufficient amounts, it prevents all weed growth.

(c). Every time water is applied, liquid manure is taken down to the roots of the plants, thus providing additional nourishment at a time when the plants are most in need of it.

(11). Two of the most destructive insect pests are the green aphis and the white fly. The former may be controlled by fumigating with tobacco and later with hydrocyanic acid gas. Before attempting to use hydrocyanic acid gas, the inexperienced grower should write to his Experiment Station for explicit directions.

(12). As greenhouse products are usually sold at fancy prices, too much care can not be exercised in preparing them for market, They should be clean and fresh in appearance and they should be packed tastefully in attractive packages. Many of our most successful growers find that it pays to use small packages holding only a few pounds. The package should be properly labeled with the name of the grower.

Quite an assortment of vegetables are grown under glass, but lettuce, cucumbers and tomatoes are very much the most important. These crops are relied upon by all growers, and other crops, such as beets, rhubarb, parsley, onions, radishes and cauliflower are grown to a limited extent. Of these miscellaneous vegetables, radishes, cauliflower and rhubarb are the most important.

## LETTUCE

Taking the country as a whole, lettuce is regarded as the most important crop grown by vegetable forcers. It is of more easy cultivation than tomatoes and cucumbers and with proper management returns satisfactory profits. Throughout the East, head varieties such as Boston Market and Tennis Ball are grown almost exclusively. When frames are used, Big Boston is the variety relied upon. It is a well-known fact that head varieties can not be grown in soils that are not properly aerated. That is, the soil must contain a sufficient amount of sand and vegetable fiber to admit air readily and to provide the proper physical conditions. The soil should take water freely when applied and it should dry quickly on top. These conditions are absolutely essential to success in growing head lettuce and it is folly for a gardener to attempt to grow this type of lettuce in heavy clay soils.

In most sections of the West, where the soil is heavy in character, the loose heading varieties are used. Grand Rapids is practically the only variety of this type planted in the Western States and in the western part of Pennsylvania and Ohio. This is a beautiful variety possessing curly leaves that are valued highly for salad and garnishing. The largest areas under glass in the United States are devoted to growing of Grand Rapids lettuce, although there are about Boston some very large ranges that are used in growing head lettuce. When a greenhouse is devoted exclusively to the culture of lettuce, with good management it is possible to remove during the forcing season four or five crops. In order to gain at least one crop during the season some growers transplant their seedlings into pots rather than flats and the potted plants are plunged between the rows of larger plants which are set in permanent beds. They may be held in this condition for at least three weeks and this means not only a gain in time, but a saving in space. When transplanting into flats, it is customary to allow an inch and a half between plants and many successful growers prefer to space two inches apart.

Lettuce requires a much lower temperature than tomatoes or cucumbers; night temperature ranges from 45 degrees to 50 degrees and the houses are held at a temperature of about 10 degrees higher during the day. With sunshine the temperature may rise to 75 degrees or 80 degrees without harm to the crop. A somewhat higher temperature is desirable early in the stages of growth and low temperature at the time of maturity is favorable to increased weight. Lettuce requires very liberal feeding and it is difficult to apply more partially decayed manure than the plants can use to advantage. The manure should be thoroughly incorporated with the soil before sterilizing. When the plants fail to make a satisfactory stand after setting in the permanent beds, it will pay you to apply nitrate of soda in either dry or liquid form. When used as a spray, good results may be obtained by dissolving nitrate of soda in the proportion of one ounce to one gallon of water. In order to make certain that there will be no danger of burning the foliage, fresh water may be used as a spray immediately after the nitrate has been applied. When it is known that there is a shortage of available plant food in the soil, it is desirable to use some nitrate when preparing the ground, although a slight sprinkling will serve the purpose. Lettuce is marketed in a variety of packages. At Toledo, where the crop is grown very extensively, barrels are in common use. In the Cleveland and Ashtabula districts, the half bushel chip basket is preferred.

## CUCUMBERS

The cucumber ranges second in importance of the vegetables which are used for forcing purposes. The crop is grown to some extent for sale during the fall and winter months, but the bulk of the greenhouse cucumbers are placed on the market during the spring and early summer. It is customary to make the last picking of cucumbers before the middle of July. Many growers use lettuce until March or April and then plant cucumbers or tomatoes. This in most instances is a more profitable combination, than to grow lettuce throughout the year. The American type of cucumber is used almost exclusively in the United States. While the English varieties are grown to a limited extent in houses on private places, they have not proven popular nor profitable in many commercial houses. In the Irondequoit district of New York, which supplies the Rochester market, a cross between an English variety known as "English Telegraph" and a strain of an American variety, "White Spine," is grown almost exclusively and finds ready sale in that market. The new variety, known as "Abundance," is unusually prolific and while the flesh is radically different in texture and flavor from the American type, it finds favor and is preferred by the consumers of Rochester. Of the American type the Rawson Hot House is the most popular. Many of the most successful and extensive growers, however, are developing special strains of White Spine to satisfy the demands of their home markets.

In order to avoid, if possible, failure from planting poor seed and in getting a type of cucumber which might not satisfy the demand, many of the best growers produce their own seed. In some instances small houses are devoted exclusively to this purpose. A separate colony of bees may be maintained in the breeding house in order that there may be no introduction of pollen from outside plants. The cucumber thrives on heavy soils, although it prefers a soil containing considerable sand. Some growers start their plants in pots but the more careful producers prefer to sow the seed in beds and then pick out the seedlings when they are very young. In fact, the tiny plants may be shifted to pots of about four inches in size about as soon as they can be handled. This is a very important matter, because when the plants are two weeks old or more, they do not stand the shock of transplanting nearly so well. There is considerable variation in the system of training. An A-shaped trellis is popular in many sections. When this system is used, plants are set about a foot apart along the lower edge of the trellis and permitted to run over the wires or slats. They are then pinched off beyond the first joint and the plants tied to the trellis. Some growers prefer to train the plants upright, tying to wires or stakes. Others grow a single stem upright until it reaches a horizontal trellis arrangement overhead and the stem is permitted to branch, forming an umbrella-shaped plant.

This system is used by many growers at Rochester where Abundance is the main variety. In order to get a full setting of fruit, the flowers must be thoroughly pollenated. This is most economically accomplished by the use of bees. Some growers prefer to keep the bees in the house, while others think it is better to have them outside. One of the most satisfactory plans is to locate the colony at one end of the house on the outside and remove a pane of glass from the house for the entrance of the bees and another pane in the roof and at one end of the greenhouse. This will make it possible for the bees to work in the inside of the house or on the outside and they will thrive much better with this arrangement than when confined in the greenhouse. The pane of glass which is removed from the corner of the roof of the house will allow the bees to pass out when they congregate, as they naturally do, in the corner of the house. As previously indicated, fresh manure is generally applied as a mulch.

Cucumbers are marketed in a variety of packages. The barrel is used at Toledo, but half-bushel chip baskets are quite generally employed throughout the country, except around Boston, where the bushel box is preferred.

## TOMATOES

The tomato offers special inducements for cultivation under glass in Pennsylvania. We have scores of towns and cities which seldom see greenhouse-grown tomatoes. This vegetable is very popular on our Pennsylvania markets and it should be grown much more largely under glass. Both the pink and red varieties are produced for the Pennsylvania markets. There is an impression in some sections that the pink variety is superior in quality, but this is an erroneous idea. The red varieties are preferred by some markets because their decorative value is somewhat greater than the pink variety. Pink varieties are not wanted on the Philadelphia markets, but they find ready sale in Pittsburg. One of our best producing varieties, namely, the Globe, is pink or purplish in color. In the greenhouse at the Pennsylvania State College no variety has produced quite as many pounds to the square foot as the Globe. It is also very symmetrical in shape, which is important when a variety is to be used for forcing. Of the red varieties, grown in the College greenhouses, Bonny Best has given the best results. This is a highly desirable variety for forcing because it matures in less time than most of the garden varieties and sets a very heavy crop of bright, smooth, well-shaped tomatoes. Comet, an English variety, is used largely about Philadelphia and is considered especially desirable for mid-winter forcing. Another English variety, known as Peerless, which has been materially improved by growers at Rochester, is also very desirable in that section, at least. It is prolific and the fruits are brighter in color than Bonny Best.

Tomatoes are grown throughout the forcing season, although the bulk of the crop is placed on the market in the spring and early summer. The plants are usually started in flats or beds and transplanted to pots which may be 3½ or 4 inches in size. The plants for the fall crop are generally set in the permanent beds during the month of August, and for the spring crop they are bedded any time after the first of February. Single stem training is practically the only method used. All auxiliary shoots or branches are pinched off as fast as they appear and the plants are tied to stakes, strings or wire trellises. In some instances the plants are twined about upright strings which is more quickly done than by tying and the support is just as good if properly managed. When the plants attain a height of 5 to 7 feet the tops are removed and no further growth is permitted, except of the foliage. As with cucumbers, a mulch of manure is applied about the time the uppermost cluster of fruit is set. Mulching should not be delayed longer than this because ordinarily it would result in fruit of smaller size. Greenhouse tomatoes should be permitted to ripen fully on the plants before picking. They should be packed in clean, attractive packages, holding not more than five pounds of fruit.

The CHAIRMAN: The last on our program this evening is a talk on fruits, by Prof. H. A. Surface, Economic Zoologist, Department of Agriculture, Harrisburg.

Prof. Surface spoke as follows:

## IMPROVING THE QUALITY OF OUR FRUITS

By PROF. H. A. SURFACE, *Harrisburg, Pa.*

Ladies and Gentlemen: The subject to which I wish to call your attention this evening for a short time is, the Cheaper Production of Better Fruit, and I wish to lay emphasis upon a feature of the subject that is not generally discussed, the cheaper production. We have spoken of fruit production in a practical manner up and down the State of Pennsylvania, until in every township in this State you have had an opportunity, during the past eight years, in our demonstration orchards, to see the better fruits produced. Here in this county, there are persons now in this room who this evening told me that had we taken their orchards for demonstration or supervision purposes a year sooner, it would have been worth at least a thousand dollars more to them. Yesterday there was a man in attendance here who, for the past four successive years, has produced full crops of apples in the same orchard under our demonstration work. Yesterday morning I received from W. H. Banzar, the President of the Lycoming County Fruit Growers' Association, a letter saying that he has now for the third successive year a heavy crop on the same orchard. That is the work we are demonstrating and that is what Governor Tener spoke about this afternoon when he asked you if you knew about our demonstration work. We have not been able, in these demonstration and supervision orchards, to demonstrate a cheaper method of production, because that lies mostly with the individual, but that is something I have worked out in my own orchard and you can now say whether it be discreditable or creditable; nevertheless, the fact is that I am now the largest owner and operator of orchard land in Pennsylvania and have certainly been obliged to work out practically a method of cheaper production.

I wish to call your attention to the various fundamental points that the fruit grower must observe in order to reduce the cost of production. He must have a regular prospect of a crop, not a crop once in four or five years, not a crop one year and an off crop the next year, but a regular prospect of a crop. To do that he must, first of all, have an available site. Now, my friends, I can take you today to people in this State and can name them,—I will commence now, because I am a great fellow to tell facts and names, too—and let anybody follow the thing up and be convinced that what I say is absolutely right. H. C. Snavely, a member of the House of Representatives, of Lebanon county, told me three days ago that in his orchard, in the upper elevated part, where the air is pure, he will have a full crop of peaches, while in the lower part it has been frozen up and lost. I can show you that spotted condition all over Pennsylvania. What does it mean? If you expect to become a successful fruit grower and reduce the cost of production, you want to select a favorable site. In my own orchard, because it is elevated, I have, at the present time, as heavy a setting of peaches as I ever saw upon trees, so many that I shall be obliged to pull off three-fourths of the amount now on the trees, unless they come off by the June drop, but it is because I have a favorable site.

The second point is a favorable soil. We need a loose soil for the successful growing of the stone fruits. A clay soil, a lime soil, is all right for apples and pears and quinces or fruits of that class, but for the stone fruits we must have a loose soil. I care not how favorable your site and other conditions are, if you haven't a soil that is properly adapted to fruit growing, there is no need of going into it, and lots and lots of people up and down this State write to met and ask me, "Must I blast with dynamite for planting an orchard?" And I say, if your soil and sub-soil conditions are such that it is necessary to blast, you haven't proper conditions for an orchard. That answers the question and who would like to go into poultry raising or the greenhouse industry or anything else, with unfavorable conditions for success? And in the same way we must rationally go into orcharding.

The third point is, as granted, a good site, proper soil and good road—we scarcely realize the essentials of a good road right at the orchard, for hauling the fruit away in an unbruised condition. I can tell you that there is more fruit damaged after it is picked than there is before, by being bruised in the process and packing and transportation. It should not be. It almost makes me sick to see a well-grown crop damaged by rough handling.

The next point is proximity to the station or market. A man would certainly be doing himself a great injustice to expect to grow an orchard twelve, fifteen or twenty miles from the shipping station or market. I know a gentleman in this State, who has a large orchard that requires seventeen teams all the time to haul his fruit to market during the picking season. I know a man in this State, who, on the last week of August year before last, paid $750 that week to have his peaches hauled to the market—he was that far from the market, the cost was that great, and Mr. George Barnes knows him, too,—Mr. Cochel over there in your county.

Now, the important point is to be near enough to your shipping station or market so that you will not lose time during the very important period of gathering your crop and that you don't have to haul your crop a long distance, with the expenses of hiring or keeping teams and the danger of damaging and bruising your crop in such transportation. The next point is the selection of good varieties. Now watch closely, my friends. I am pointing out those features fundamental to success in economic fruit production, that any one of them will cause a failure if it be absent—any one of them be missing from the plans of the horticulturist will put him at a decided disadvantage in competition with the other man when the competition becomes keen.

The selection of good varieties. A gentleman told me recently that he could sell Ben Davis or York Imperial. I said, "Yes, but wait till we have a bumper crop, a heavy yield, and I can take my Golden Stamen, Winesap, Roman Beauty, Winner, Bandana, and you can go through the streets and sell your Ben Davis and Yorks and I will follow right after you and hand the prospective customer my apples and he will say, 'Yes, I just bought some, I don't need any,' and I will say, 'Sample this apple and the one you bought and then see what you want hereafter.'" Have a good variety and have something to talk from and when you sell that variety, let the customer know what it is. I have orders for varieties booked now, here in my pocket; for example, I met a teacher in Camp Hill, Prof. Rice, who said, "As soon as your Crosby peaches are ready I want you to be sure to remember me with eight baskets." When I sell the Crosbys I tell them what they are. I have now several orders for the Champion peaches. I have an order from one man, who said, "As soon as your Old Vixens are ready bring me a basket every other day, with ten baskets for preserving." But I made this rule in planting, to plant those varieties which I know are good and which I like and believe the other people will like them. We cannot expect a permanently successful horticulture in this State based upon the planting of inferior varieties.

The next point is good, young trees kept vigorous from the time they are grown in the nursery. It does not pay to buy culled trees at a low price, because they are cheap. If you buy good trees it does not pay to let them lie around until the roots are dry or the bark commences to shrivel or the buds have started or they are damaged otherwise before you plant them. Keep them in good, vigorous condition until they are properly planted. Now I said good, young trees. One-year-old trees are to be preferred under all circumstances to older trees. I am sometimes asked, (I am getting along well in life), why I didn't plant four or five-year-old trees and save time by it. I can take a one-year-old tree and I can make it bear fruit sooner than—I can't say what you will do, I won't say sooner than you can make, but sooner than I can make two or three or four or five-year-old tree bear fruit, and what is more, I can make a much better tree of it than of an older one. This young tree should be properly pruned both before and after planting. I prune the roots to a length of 6 inches and prune the top to a height of 18 to 22 inches. If a tree is not pruned back at the time of planting, it will not start well and we want it to start well. These are essentials to success in the cheaper production of fruit. It should be properly planted. A tree poorly planted will stand still and grow but little the first year. It should be properly planted as to the distance apart of planting. Trees planted too closely together will be a source of discouragement to the grower as they become older. Apple trees, for example, planted 15 feet apart or even 30 feet apart, for permanent trees on good, rich soil, will be unsatisfactory. I started out by planting them 32 feet apart, with fillers 16 feet apart, or half way between, and I changed to 38 feet apart and now to 40, and all my permanent trees are 40 feet apart and I would recommend no persons to plant less than 40 feet apart. I have a good many letters coming to me from persons who say their trees are 25 feet apart. What are they going to do? They can send them up higher, but that will not relieve the difficulty. Modern horticulture demands low-headed spreading trees, that is the most fundamental point I have to give you, low-headed spreading trees and you cannot get it with trees that are close together. Avoid the mistake at the time of planting and get them far enough apart.

A Member: When the mistake has been made, what is your recommendation?

PROF. SURFACE: I would cut them out by a system of thinning, but I would have to see the orchard to say just what the recommendation would be. Plant in long, straight rows so you will have no more loss of time in turning than is absolutely essential. The same principal enters into the cultivation of corn and other crops. You cultivate short rows and you will lose time in turning and wear and tear on your implements and teams. It is harder on a team to be turning around and around than to be going straight ahead. I throw out the fences and plant clear across from one-half to three-quarters of a mile, and that is practical orchard production to reduce the cost of production.

Proper planting in regard to fillers. Now if you are planting your permanent trees 40 feet apart, you can put fillers in between them 20 feet apart that can be carried 8 or 10 years. They may be young bearing varieties of apples, like the Duchess, the Waggoner, the Yellow Transparent and other I can name, or they may be peaches or they may be standard pears or they may be dwarf pears, as I shall show you, but you must practice proper planting in regard to fillers. Your fillers, or young bearing varieties, will commence to give you profit before permanent trees come into bearing. For example, my dwarf pears, the second year they were out, commenced to give me a yield and the third year a good yield. The standard varieties were 20 feet apart, the dwarf, 10.

Proper planting in regard to pollenizers. In Missouri, when they had the great orchard fever for planting and planted great areas of one kind, they found they didn't bear fruit because they needed other varieties for pollenization. The best plan is to plant four rows of one variety, then four rows of another and come back to four rows of that variety. Four rows will let me drive between two rows and gather the fruit into the middle. Four rows is the nicest system of planting your trees to get the fruit together with economy, ease and system. If I had only two kinds of trees to plant I would plant four rows of one kind and four of another. For economic production we should avoid the planting of too many varieties for commercial purposes. Four varieties of apples are generally about enough unless it is a local market that you are going to reach by the peddling process, and then the more you have the better to give a prolonged picking system from first to last.

Proper cultivation. And by saying "proper," I beg the question. We must explain what "proper" is. That is best shown in the illustrations, but cultivation is essential. Cultivation of a special kind on a hillside by bringing down the soil to a bank so that the tree will stand in a kind of a bank or terrace on the hillside.

Proper cultivation in regard to intercrops. If you wish to grow fruit with economy you will want to grow some kind of crops between your trees, a low crop, I mean to say a farm crop; that is called an intercrop. You can grow corn, potatoes, beans—vegetables—any kind of a cultivated crop between your trees with profit and the kind of cultivation that the crop receives is the kind the trees should have.

Proper cultivation in regard to cover crops. No orchard should ever go through the winter without a cover crop on the soil. Let the intercroping or farm crop be such that along in the fall you can grow crimson clover or vetch or rye and vetch. That makes an excellent combination and gives a cover crop there to cover the soil, to hold the drifting snow, to keep the roots warm, to hold the soluble soil fertility, to bring nitrogen from the atmosphere and put it into the soil and give you organic matter to turn down for next spring. I have 80 acres at the present time of that kind, as dense all over the orchard as you see it there, and it is as good, according to the reckoning of the experts, as 15 tons of barnyard manure to the acre. Now that is growing fertility with economy, when 8 quarts of crimson clover seed to the acre sowed at the last working of the orchard can give me by the next spring a value of 15 tons of barnyard manure to the acre.

A Member: What do the seed cost?

PROF. SURFACE: $4.25 just now. It cost me $6.00 or $6.50. Hairy Vetch is a great nitrogen gatherer. It is a legume crop. It belongs to the pea and bean family. Any plant that belongs to the pea and bean family is a nitrogen gatherer and a soil manure.

A Member: What are you going to do with that stuff? Plow it under

PROF. SURFACE: I am going to save it for seed in this case; it will ripen early. You see how long some of these heads are. It will be ripe in two weeks' time. As soon as the crop is cut off I will chop it up with the disk harrow and put it in cultivation. I won't attempt to put an intercrop in this orchard because it has got too old for an intercrop. I don't care to keep an intercrop in a peach orchard after it is four years old. Then, proper spraying with the right material at the right time, the material at the right tension, with the right kind of apparatus and sprayed in the right manner, which means thoroughly—all those are necessary. If any are omitted it will be an element of error that will result in failure. If you use the lime-sulphur solution for spraying, that is the best and most economical material for a poor man for winter spraying, winter spraying, but if you don't use it strong enough you will fail in your purpose of controlling a great many of the pests that would be controlled by that spray. Throughout our county, the farmers have failed in general, not all of them, with their lime-sulphur spray for the reason that they have diluted it too much; they have used the commercial material which comes in packages marked, "Dilute 1 to 10," and they have done so and it wouldn't dare stand dilution more than 1 to 7. They diluted it so far that it wouldn't kill the scale; so use the right material at the proper strength.

**MR. SEEDS:** Scale is getting scarcer all the time.

**PROF. SURFACE:** Yes sir, it is being controlled better than ever before. I have scale all through my orchard and we are not worrying one whit about it any more. If I thought scale would be a serious menace to horticulture I would stop putting my hard-earned savings in orcharding. I think I will be able to keep it under control by using the same methods I should use if there was no scale in the orchard. If there were no scale in my orchard I would give the same treatment as though there were, because the material I use for scale kills other kinds of insects and also plant diseases.

The proper thinning of fruit must be practiced. We are going to hear more in the future of thinning fruit and it must be done. The trees must be cut back at the right time.

Cutting back when there is no crop. Last year, as soon as I found that the thermometer had reached 35 degrees below zero in my orchard, I knew the fruit buds in the peach trees were killed and I gave orders to have the trees cut back half their height, or 4 feet. It resulted in a wonderful growth of new wood all set heavily with fruit buds. I had the orchard sowed with crimson clover and let it go to seed and took off the seed during the year when I had no fruit to worry about that clover taking the water from the ground. I had 100 bushels of crimson clover seed to sell and a good, strong setting of fruit buds that were so strong that the recent freezing did not kill them, and I hold that I lost nothing whatever by the fact that I didn't have a fruit crop last summer.

**A Member:** After you cut back your peach trees, do you thin the shoots out any?

**PROF. SURFACE:** The trees are made so wide by this cutting back that the growth is so scattering, they don't need to be thinned. If that growth were in a dense, narrow state, it should be thinned, but it is so spread over the tree that it has not been necessary to thin it.

Cut back summer pruning. You are going to hear much more of summer pruning in the future than in the past. Cut back to balance your tree and make it symmetrical. A one-sided tree is not profitable. A tree missing means the loss to the owner of the crop that tree would produce. One tree to the acre out of an orchard means the loss of enough fruit to pay for the working of that acre the whole year. The same principle comes in with a lopsided or half-sided tree—you lose half the crop. Cut back until the tree is so balanced that it will be a symmetrical, well rounded tree. Remove the dead, dying and fatally diseased trees promptly, because they are a loss, and get in new trees in their places. This is economy in production.

A Member: Aren't you losing a good many half crops while you are cutting that back?

PROF. SURFACE: No, not if I cut back judiciously. One need not cut back all the top at once and when you cut back any part it will stimulate growth all over the tree, but the stimulation will be nearest to the point where it was cut off. It does not pay to let an old, sickly tree remain when you can take it out and start a new tree. It does not pay to attempt to doctor the old trees that are in a hopeless condition, when you can start new trees and get a good crop within a short time.

Trees must be properly fed. I use, especially when the trees are young, if the growth is slow, nitrate of soda; a little pinch, a tablespoon, around a tree in the summer when it is slow in starting to push out its branches or leaves will bring it out more quickly than anything else I can use. It starts the growth of the tree and stimulates it like a stimulant would a tired man. Phosphoric acid and potash may be purchased profitably by the orchardist, but in economic fruit production you cannot afford to buy nitrogen, and I have not bought half a ton of nitrogen excepting what has been grown from nature's laboratory.

A Member: Aren't you afraid of getting too much nitrogen?

PROF .SURFACE: That can be controlled. If I cut this off for seed, it would be taking away a great deal of that nitrogen, or if I see my trees are growing too rankly, that is an indication of too much nitrogen and I would mow it for hay. You can use rye, which does not bring down so much nitrogen in the soil.

Proper and timely picking are elements in economic fruit production. Fruit should be so picked that it is not bruised. It should be picked at a time when it is at its best. Pears, for example, are left by the inexperienced until they are ripeneing on the trees. That is wrong. They should be taken off when the seeds are brown and put away in the dark to ripen. The art of picking at the right time is a very important art and cannot be well taught in a lecture. The best place to learn is in the orchard with some person who is picking.

Proper grading is essential if we wish to get the best results in selling our fruit, but the proper way to grade them is by thinning them on the trees.

Proper packages and proper methods of hauling. I have seen apples put into barrels like potatoes, thrown on the wagon like grain and hauled in that way and sold at a price that is inferior, of course, because of the method by which they were handled. A grower should replant a tree as soon as it dies. He can put it right back in the same place so as to get the place where it should stand. I know several successful growers in this State who practice that method. The question will come up as to replanting a tree where there is disease. Mr. Savely will take up a tree at this time of year or in the summer, that is diseased with yellows, and plant a tree right back there this fall, and I have seen in his orchard peach trees 24 years of age still bearing fruit.

Make your own tree material. You cannot afford to buy it unless you are unsually wealthy. You can make it cheaper and fresher and have it more efficient than the material you buy. Prompt and proper treatment of pests must be given. They don't always demand spraying, but they should have prompt and proper treatment. To let pests continue in the orchard until the trees show the injurious effect of pests means to lose profit and for profitable production of fruit a man should live with his trees and on the very first sign of the presence of pests should get rid of them. He should buy and use implements adapted to orcharding, not the ordinary farm implements, but spreading disk harrows, orchard disks, side-draft implements, implements like the Morgan Orchard Hoe and others made especially to reach in and around the trees. One must be careful to avoid bruising the trees, because if he does he is going to make places where disease germs will enter. Keep bees in the orchard as a means of reducing the cost of production, because it increases the amount of fruit. Keeping bees in the orchard is as important as the interpollenization of varieties. Preserve the friends of the orchard, which are the birds, beneficial insects and other creatures that will destroy injurious insects. That is the outline I will give you as an address and I will be able to run through the slides more rapidly by having given you that outline.

I will show you two vetch plants. These are the same age. They were sowed in October. This soil was not inoculated and this was. You seen the difference in growth by inoculation. This is just commencing to show buds and this is in ful bloom. That is a picture of a portion of my own orchard. I have about 100 acres in that plot. You will notice the length of the rows, planted straight for cultivation. I have peach trees planted solid in the orchard beyond this, peach trees as fillers between apples trees in a low part of the field where the cold air is liable to settle. I have plum trees and still below that, pear trees. The pear and peach can be planted on lower soil. On this far point we have also a young peach orchard, this rolling land we get air drainage where the peach trees are planted, I avoid planting sickly or inferior trees. This tree is diseased with crown gall. If you receive anything of that kind in the shipment of nursery trees throw it out. The tree will live and grow, but will never give you a profitable crop. The subject for this address is profit in horticulture in regard to the economy of production. Here is a Winesap apple tree only three years of age, bearing apples. Now, my friends, I said proper pruning, but understand, after a tree reaches the size and age of this, the more you prune that away when it is dormant, the more you stimulate growth and postpone its bearing. If you prune a young tree too much you will make it grow more, but it won't come into bearing so soon.

A Member: Won't you get as much in the long run? It hurts the growth of a tree to bear too soon.

PROF. SURFACE: If it is bearing no more than that, that's enough. That one I can be postive of the variety, and if I want to take guaranteed cuttings from that, I can do so, but the tree is growing fast enough without stimulating it to further growth by pruning when dormant. I said treat the trees properly when they are received from the nursery. Here we are healing them in by tramping the earth over the roots of the trees just as they have come from the nursery, even if it is to be only a few hours until they are put into the ground, I wouldn't have the wind and sunshine strike the roots of my trees if I could possibly avoid it. By the way, some persons say they want to see some of these professional men in their working clothes. They have a chance to see one there. He has his coat off once in a while when he is at home, I assure you. We receive our trees by the wagonload. Everything must be done in a speedy manner to get it done fairly well and to get the results. We bring the wagon up to this power saw and clip the trees by sawing. The trees come 10 to 25 in a bunch and are passed to the operator, who saws them up, throws them on the wagon and goes ahead. I can prune my trees about twenty-five times as fast by that method as I can by hand and I think that the results will show you in a few minutes that the trees are not injured by that method of pruning. That is the lower headed tree of which I spoke. Now, there is a tree less than three years of age at the time the picture was taken. Most persons would have pruned that up to a height of three feet and would have lost this crop that I get the first year. I have from 2 to 2½ baskets of peaches on that tree. The lower headed tree gives me not only early fruit, but it gives me less dropping of fruit in the manner called windfalls by most persons, that is, when they ripen, these branches reach the ground, with their load of fruit and resting on the ground are bruised, and the tree is not shaken by the wind kind and the fruit is not shaken from it.

I am asked, how do you cultivate under the trees? A low headed tree gives opportunity to thin by hand, to prune, to spray and to pick with economy; above all else, it lets the tips of the branches rest on the ground and the tips of the other branches above rest upon them and saves the tree. There is a Stamen Winesap tree that bore 18 barrels of apples, three bushel barrels. See the shape of the tree with its spreading branches coming clear to the ground and not a broken branch on the tree. That is a Yellow Grimes Golden three years old and bearing. It shows the result of the planting of fillers. The Grimes Golden is a young bearing variety of tree. The Winter Bandana does not bear so young. Every other tree through this row of apple trees growing in this way is a young bearing variety. The next row of trees, 20 feet from that, is a solid row of peach, then a solid row of apple, alternating with a solid row of peach. The long rows give us an opportunity for swinging through the long distance of 3-4 of a mile with the implements of cultivation. The elevation with a gradual slope off to a hill 30 or 40 feet high gives air drainage. That is the Ganio apple, but the purpose of this illustration was to show the method of cultivating the tree row itself. Here we have clover between the trees. In this way the young tree is kept cultivated the first five or six years for the apple and all the time for the peach. The dwarf pears, as I said, are planted as fillers 10 feet apart, between the standards. These commenced to bear the second year they were out and gave me considerable profit the third year. It doesn't need to be cultivated as does the peach. There are pears on that tree weighing 18 ounces apiece; the third year the trees were in the ground they gave me 7 wagonloads that sold readily for 75 cents a half bushel basket wholesale to the wholesaler. This is the Ganio apple tree bearing a considerable quantity of fruit at the age of three years, showing again our method of cultivation of the rye stubble. We grew rye between the trees, but now the row cultivated.

Different varieties of trees are planted for pollenizers. There's a pear orchard three years of age and bearing. Even some of the standards are bearing; it can be seen that every other tree here is a standard, every other tree in the other direction is a dwarf, and between the tiers as secondary fillers there are currants. The currants have given us enough profit to pay for the land and tree and work done in the orchard, so the pay has come from the currants and the dwarf pears have been net profit. I plant the fast prolific and the cherry, chiefly. My friends, here is an illustration, showing clean cultivation. The spike harrow is the best after once cutting the land up in the spring with the disk harrow. There is a good view in the peach orchard. The spike harrow reaches far enough to let us do all the cultivation the trees will demand. The trees are 18 feet apart, but will be 20 after this. Eighteen is a little too close. Now what is all this for? Why are we doing this work? It is for fruit. We are after fruit of the best quality we can get and as soon as we can get it. Any method that will bring us good fruit in abundance, early, is certainly a method that should be adopted, and there is a new thing in an orchard only four years of age, it is not four years of age, because that is it's fourth summer. It was three years and four months after the trees were planted that that picture was taken and that orchard is now set with a heavy setting of fruit at the present time. Here is a photograph of an orchard at the end of the first year's growth. We had potatoes in the orchard, took them out, harrowed it in each direction and drilled in rye. At the end of the next summer or during the next summer the rye was taken off, chopped it with a disk harrow and crimson clover was sowed. The crimson clover simply caught and grew, a scattering growth. The next summer when it ripened, it was chopped up with a disk harrow and harrowed thoroughly over the field with a spike harrow, and here is the result. I never saw such a wonderful growth of vegetation as there, I mean, in an orchard and under any such circumstances. Now that picture was taken last year. That crimson clover lived through a temperature of 35 degrees below zero. One need not say to me any longer that crimson clover freezes out; it is not a matter of freezing the clover, it is a matter, perhaps, of cracking the roots by having it in a heavy soil. In my soil it does not kill the roots.

A Member: What effect does it have on the growing of the trees?

PROF. SURFACE: It certainly has not injured the trees. It is giving all the strong growth I desire. If it is going to make too much strong growth, I will cut it off. It is not reducing the growth to any less than what I want. If I think it is too much I will cut it off. I can hold it in check. There is danger of growing too much if we leave it in there and turn it down. Here is an orchard. See the young peach trees standing there, but we are growing lima beans between the trees, of course. There's a good crop of lima beans. Here is an orchard 2½ years of age. We are growing vegetables between the trees, cabbages and tomatoes. D. M. Wertz, who, until recently, has been the most extensive fruit grower in Pennsylvania, whose orchard is in Franklin county, started his trees regularly by the system here shown, which is in a corn field. This photograph was taken in the fall of the first year of his peach orchard. He plants his corn in hills and a tree stands just where a hill would come. Perhaps I should say that he plants his corn in such a way that the hill will come just where the tree stands, because the tree is planted before the corn is planted. It is cultivated in each direction

That is an interesting and wonderful picture, showing how a man with a growing crop gets profit from his orchard the first year by regular intercropping corn and potatoes. I have gone further than that; not only have I planted the corn, but instead of replanting with corn I replanted with sunflowers, that can be planted later than corn, and we have had a wonderful growth of sunflowers, which is the best poultry food we can grow. After the corn is taken off the land I keep the tree row constantly cultivated and you see the nice cultivation shown by that tree row. This shows the length of a tree row that I am planting. This picture shows the rye starting in the field. That was sowed with clover the next spring. Here is a pear orchard in the spring or summer just after the trees were set. That spring we planted in corn. We are looking up the pear row where it is cultivated—planted to corn. It was sowed to crimson clover at the last working of the corn and to oats and cow peas. Now notice, my friends, how I got in the legumes that year, the oats and cow peas. The next summer the oats were cut with a binder swinging right back and forth. The oats always kept cultivated and this year there's as heavy a stand of clover in that orchard as I have seen for many a day. Lieut. Col. Reynolds and Senator Clark, of Erie, stood and looked at it last Friday and said, "If we could get a stand of clover like that we can grow anything on that soil," and so you can. Where it drops down to a lower elevation of the land I have planted pears. In that pear orchard I went so far as to grow millet. The farmer is there, cutting millet with a one-horse mower, and the pear trees made a good growth because the row was kept cultivated. This is a picture in Westmoreland county, where the apple trees were kept cultivated in their rows, but there are blackberries and raspberries as the intercrop in that orchard, which can be done successfully if they be kept cultivated. Here is a picture in the orchard of Mr. Benj. Copelin, in the upper part of York county, where he has grapes as an intercrop between his apple trees and he has made good profit from his grapes. The bearing of this stalk is to show how the orchardist can get some profit of some kind before his fruit crop comes in or before his trees become so large as to demand all the soil.

It is the subject of economy of production, utilizing everything possible. I said that one of the important points is the growing of a cover crop. Here is an orchard in its third year. These are my inspectors and demonstrators gathered around this orchard, with crimson clover and cow peas turn about. That makes a combination as good as a person can get. It is no wonder that the next year, which was last summer, I took a magnificent crop of potatoes from between those trees. Here is a young orchard, edged by a lot of pear trees. This is a one-year peach. It does not show plainly, but the point before us is that corn was growing in that orchard and it was then sowed to crimson clover, and the dark areas there are mats of crimson clover. It is such a soil renewer that I have something to say to you now that is most remarkable. Down near Hanover, in York county—and I suppose Mr. Barnes knows of the case, too—there is a gentleman who for the past four years has sowed crimson clover just as the last working of his corn, in the corn, letting it grow as a cover crop that fall and winter, turning it down the next spring and planting corn again, using no manure and no fertilizer and increasing his yield each year 10 bushels above what it was the year previous, and that is a remarkable thing to say.

A Member: Do you sow your clover before or after you cultivate?

PROF. SURFACE: It does not make any difference whether it is immediately before or immediately after; if the soil be real loose and fresh at the time, I prefer to sow it immediately after the cultivator has run, because it is liable to be turned down too deep is sowed before the cultivator, but I don't want the soil to settle before it is sowed. The first year it may only give you a thin stand, but the next year the soil will be inoculated and give you a dense stand. Here is an apple tree, not sprayed, in the orchard of Irwin Slapin. We took his orchard for demonstration purposes. He sent me these photographs. There's an apple tree of the same age and kind that is sprayed. See how it is bowed down with its load of fruit. He told me that from an acre of that orchard that we used for demonstration purposes he took five hundred dollars' worth of fruit more than from any other acre in the orchard, and this is a fair showing of the results of spraying. This is from the orchard of Mr. Homer B. Howe, of Wellsboro, Tiogo county. It is as fine a showing as any western fruit that could be taken. Every fruit absolutely perfect, not a mark on there showing a blemish by a fungus disease nor a worm injury. Spraying gives perfect fruit and consequently helps to get a better yield and better prices and consequently reduces the cost—spraying with the right material. There are leaves curled by the aphis or plant louse. We used for that a concoction of arsenate of lead. Someone asked me why he had failed to kill the bugs with arsenate of lead, and I found out that the bugs he was praying were plant lice. If you will just mix a little molasses with the dope and spray with sweetened arsenate of lead, the louse will come and feed so greedily as to be poisoned.

Here is a photograph of a tree from Shannondale, Pa., which was killed by the insertion of a capsule made at Allentown and sold as Plexner's Scale Poison and Tree Fertilizer, and someone has said that the name should be reversed and it should be Plexner's Tree Poison and Scale Fertilizer. The owner of that tree paid a dollar to have the capsule put in at the place you see and it died, blighted up and down until the tree was gone. Scores and scores of persons came to me last summer and told me their trees had been killed by this treatment, yet the man is operating. The last I heard of him he was in Cumberland county about five miles from my own orchard. He works one county until he is shown up, then he moves to another. Do you think it possible that anyone owning a tree would hire a man to go there and put in a dose of dope of that kind, without knowing what yould happen and pay that price, a dollar, to have the tree treated and killed? There are many people who never have sense enough to succeed in horticulture, I assure you. I say, make your own material. There's myself and a farmer making our lime—sulphur solution. We are testing its strength with the hydrometer. You will never know if it is strong enough unless you do that. I use the ordinary cheap grade of commercial ground sulphur and I've got that batch I'm testing there stronger than any commercial material I have ever purchased. Think what that means, right there in the photograph, where the hydrometer is giving me a stronger test of concentrated lime-sulphur solution than any I ever saw taken from a barrel of commercial material, with a low grade of ground commercial sulphur costing $1.25 a hundred at that time.

A Member: How do you keep your solution from crystallizing?

PROF. SURFACE: Take off the red liquid and separate from the sediment right away and store it away. If we store it with the sediment it is liable to crystallize. The sediment is very useful. I keep it to itself and the next summer I paint it around the trunks of the peach trees to keep the bores from coming and injuring the trees. I use ordinary stone lime, quicklime; the best lime you get is from York, burned by the York Lime Co.

A Member: Is there any difference whether you use the ground sulphur—flour sulphur?

PROF. SURFACE: I use the cheapest grade because it is cheaper, that is all. This photograph shows an experiment of three kinds, the highest of all called flour of sulphur, the next grade called ground sulphur, and the next grade called commercial ground sulphur, and you get a stronger solution by the hydrometer reading from the lowest grade sulphur. I don't know why, only it was so. To make this concentrated lime-sulphur solution I boil two pounds of sulphur and one pound of stone lime in one gallon of water for one hour. That is the concentrated material. I dip it off from the sediment, store it away in a barrel and it will keep as long as you want it, years and years, if you desire. When I want to use it I dilute it to test it with a hydrometer; that hydrometer has directions with it given by the manfacturers, the Carbondale Instrument Company, of Carbondale, Pa. They mail it to you with full directions for use for one dollar. I am not interested in its sale, although they say it is made according to my specifications. It will make a material that can be safely diluted with about 1 to 8.

Notice the spraying of this peach tree; it is thoroughly sprayed from top to bottom, so that every particle is covered by the lime-sulphur solution. This tree shows something else that should interest you. It is just bursting into bloom. I photographed it as soon as it was dry after spraying. There's a peach tree three years of age. You can judge its size by the couple of little peaches. There may be some things that cannot be treated by a spray, but I haven't time to go into those questions now. You will get them in my Bulletin. An apple tree infested with San Jose scale. It is more economical to produce good fruit than more fruit. There is no reason why the scale insects should run riot in an orchard when they are as easily controlled as they are. One good, thorough spraying when the trees are dormant, using material strong enough, will destroy the scale. I said at the right time. The buds here shown are not open far enough to be sprayed. Blossoms with the petals open are too early to be sprayed. The fruits here shown have gone past the proper stage for spraying. The calyx points were closed; where they are just ripe, the calyx points are wide open and it is the time to get your arsenate of lead down there and it will never be injured by the Codling moth. Oftentimes insects will come and if allowed to remain in the tree until nearly grown they will be hard to kill. Spray while young. Live among your trees, as Prof. Wittman lives among his poultry, as Prof. Watts lives in his greenhouse, as a successful dairyman lives with his cattle. When the first evidence of these things comes, spray them. A material half as strong will clean them up then, whereas one twice as strong may not clean them up later. They are easier killed while young and that is before the damage is done to the tree, by removing its leaves, which are both the lungs and stomach of the tree. Spray while the trees are dormant and use the lime-sulphur solution.

The great berry moth—I know a doctor in Cumberland county, who got an ordinary tin spray that cost him only one dollar, and sprayed his grape vines with that, but it blew a mist, like an atomizer, over his grapes. He used arsenate of lead and he said, "We have had the finest crop of grapes we have ever seen grown in this part of the country." It doesn't make much difference what kind of apparatus you use, so it will do the work and spread the spray evenly over the trees. We think we have some pests in this country, but see the green tree moth or gypsy moth in Massachusetts. They have already spent over three million dollars and they are not wiping them out, simply trying to keep them from spreading into the trees of the surrounding country. Thin the fruit. This branch had twice as many peaches on it as it should have. If it is a young, vigorous tree, this might be left. If the fruit is not thinned, you have too many different sizes on the tree, which demands grading, and there is no economy in that.

Here are peaches on a tree not thinned; you will notice the small and large side by side. A small fruit, even though well grown, in a package with large fruit, will kill the sale of the large and the large will spoil the sale of the small, and you have got to grade two or three sizes to sell with the best results. There are the pickers in my orchard, thinning the fruit. The trees are low enough so that I can hire women. I have one experienced man thinner to work through there, pulling the fruit from the trees, so they can just pass their hand between the fruit that is left on the trees. As a result of that thinning, which cost me fifty dollars, a gentleman from Clearfield came in my orchard just before the fruit was ripe, saw it on trees, made a contract for it, and after he paid me a hundred dollars, he said, "Now, I want to tell you, that is the first orchard of strictly fancy fruit I have ever seen," and he said, "It's my fruit, I bought it; now you follow my directions (now note the point). "I want you to take your baskets out under those trees at the time of picking, pick the fruit from the trees exactly as it comes, because there is no grading there to be done, fill the baskets, put the covers on, and haul them away to the ice car; rush the thing right through." We did it; we filled the car in the afternoon. We had no grading to do, because the fruit was graded by the thinning on the trees, and when I got $600 for that carload of fruit I felt that it was doing pretty well under the circumstances.

Note the even distribution of this fruit, the large size of the fruit. You will have the fruit bearing from top to bottom and throughout the entire tree by the process of thinning, and what is more, the tree will not overbear; you don't have a heavy crop one year and dearth of a crop the next year. By letting the tree bear only what it properly can, it will set the fruit buds for the next year and you will have a crop the next year. The low shaped tree, the low, open-headed spreading tree will droop outward, as you see this tree. There is a peach tree four years and five months of age, that gave me 11 baskets of peaches to the tree, which sold right there in the orchard for $1.25 a basket. On account of the shape of the tree, from over 45 acres of bearing fruit trees, there was only one broken branch. This is something different. There's a tree that was not thinned and was not properly sprung. That's a young orchard a mile from my own. There's a Ben Davis apple tree that bore 17 baskets of apples when 8 years of age. That's straight, but it broke itself all to pieces in the process of bearing. What a deformed tree one will have there, unless you cut that top clear up here, cut off the broken limb and build a new top on it entirely. Had it been low enough and the fruit fairly thinned it would have stood and borne year after year. There are two peach trees the same age and kind, both injured by winter freezing. This was cut back and gave a dense top. This was not cut back. There is a poor tree and there is a good tree. Cutting back after freezing will give you good trees. This is a peach tree in the orchard of Dr. B. M. Stone, of New Freedom, York county, injured by spraying it with scale acid. This he didn't cut back; this he did, and they grew new tops and he had good trees afterwards, after freezing. Here is a tree that it would not pay to cut back. The proper thing to do, instead of spending time waiting for that tree is to tear it out and put in a new tree this fall.

A Member: In what way does the scale injure trees?

PROF. SURFACE: It enters lenticils, enlarges them considerably and starts the death of the bark at the base of the natural bark. Mr. Tyson, for the past two years, has sprayed with lime-sulphur solution instead of scalicide. His packer a year ago said he could not find enough fruit free from scale to justify his trying to pack it properly. After Mr. Tyson, for two years, sprayed with lime-sulphur solution instead of scalicide, the same packer said, "I can find lots of good, clean fruit now and pack faster." Here is a tree that was not properly cut back, not cut back far enough. It gives a new growth to the top way up there where it is already too high. The crimson clover gives a good winter cover crop and nitrogen to the soil. Here we are mowing the crimson clover and swing right back on the other side and have no trouble in mowing there. The owner of the orchard is driving the mower in that case. Vetch is a great soil manure, a great cover crop, and if you are too far north for crimson clover to do well, I certainly recommend the use of vetch. We are there making in an ordinary open kettle in an outdoor shanty, the boiled lime-sulphur solution.

Here is a man who can read and write, but has little other education, who makes the solution when I am not there, and he makes as good a solution as I or any other person can make. Don't be misled by the agents of manufacturers who tell you that it needs an expensive laboratory and special chemical knowledge to make your own sulphur solution. Any vessel will do except copper. I have used an iron washtub. Peach tree and apple tree borers have to be got out by washing the trees with lime-sulphur solution the first of the months of June, July and August. Repeat that as I direct and you will be able to keep the borers out of your tree, but one application alone will not do it. The tent caterpillar is unusually bad this year. Don't attempt to burn them out, but spray for them. The apple tree borer. Where this is in the tree, don't take the old method of cutting it out with a knife; it injures the trees and is a slow process. Put into a spring bottom oil can, the material known as carbon bisulphide. Insert the tip of that oil can into the hole made by the borer, send a jet of the liquid into that hole, close it up by clay or mud. The fumes will go all through that hole, however winding it may be, killing the grub, and it will not injure the tree like cutting. Now, that is worth something, worth knowing, for you who have the borers in your trees. There is just one genus of beneficial insect; that is the ground bettle. Of about 30 or 40 different kinds, there are more of our insects that are beneficial than are injurious. There is one that feeds upon plant lice; there is one eating the pear tree cilia. We should preserve our insectivorous birds as well as the beneficial insects. Only recently I have had complaint of the effects of mice and rabbits girdling trees. We should preserve their natural enemies and fight against the bounty on hawks and owls, which is now proposed. From the blossom to the fruit should be our purpose. We live in a progressive age and we may not expect it to be long until we will be spraying our trees by the latest inventions of science, by an aeroplane carried over the orchard.

The CHAIRMAN: This completes our program for this evening. I believe this session covers the full Institute, so that it will not be called in session tomorrow morning. The meeting now stands adjourned.

A. L. MARTIN,
Director of Institutes.

V 33

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

BULLETIN No. 242

# TABULATED ANALYSES OF

# Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE
WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

**From January 1 to August 1. 1913**

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

## OATH OF FERTILIZER SAMPLING AGENT.

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Commonwealth of Pennsylvania, ss:

Personally appeared before me, ................................ of ....................County of .................... and State of Pennsylvania, who being duly sworn, according to law, doth depose and say: That he has been duly appointed an agent of the Department of Agriculture of Pennsylvania to collect samples of Commercial Fertilizers for analysis, that he is not in any way interested in the manufacture or sale of any fertilizer, and that he will perform the duties of the office with fidelity in accordance with the requirements of law to the best of his ability, and as set forth in the instructions issued by the Secretary of the Department of Agriculture governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this
.................. day of ..........
A. D. ..............................
......................................

(Signed), ................

COMMONWEALTH OF PENNSYLVANIA

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Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE.
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# The Act of 1st May 1909, Commonly Referred to as "The New Fertilizer Law" is as Follows:

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## No. 205.

## AN ACT

**To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.**

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand of trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year: and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more then one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of

business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, or any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

## No. 95.

## AN ACT

**Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.**

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

State College, Pa., July 16, 1913

Hon. N. B. Critchfield, *Secretary of Agriculture, Harrisburg, Pa.*

Dear Sir: I have the honor to transmit herewith my report upon the analysis of the samples of commercial fertilizers received from official sampling agents during the spring season of 1913.

Very respectfully,

WM. FREAR,

*Vice-Director and Chemist.*

The Penna. State College Agricultural Experiment Station.

## FERTILIZER VALUATIONS.

The object of an official valuation of commercial fertilizers is to enable the consumer to judge approximately whether he has been asked to pay for a given brand more than the fertilizing ingredients it contains and market conditions prevailing at the time would warrant. It is clear, therefore, that no attempt is made in this valuation to indicate whether the fertilizer valued possesses a greater or less crop-producing capacity than another fertilizer; but only whether it is higher priced than another of the same general composition.

For this purpose the valuation must be so computed as to include all the elements entering into the cost of a fertilizer as it is delivered to the consumer. These elements as they occur in the usual transaction, which is a time purchase in small quantity from a local dealer or agent, may conveniently be grouped as follows:

1. The wholesale cost of the ingredients.
2. The jobbers' gross profit on the sale of the ingredients; this includes office expenses, advertising, losses, etc.; for the purpose of the present computation it may be assumed that the sum of this gross profit and the wholesale cost of the ingredients, is equivalent to the retail price of the single ingredients near the wholesale markets in ton lots of original packages for cash.
3. The expense and profit of mixing: This item applies only to complete fertilizers, rock and potash, and ammoniated rock; not to dissolved or ground bone, or to dissolved rock.
4. The expense and profit of bagging.
5. Agents' commission: This item includes not only the commission, proper, but every advance in price due to the sale of the goods through an agent in small quantities on time, rather than directly to the consumer in ton lots for cash.
6. Freight from the wholesale market to the point of delivery.

The valuations for 1912 were based:

1. Upon the wholesale prices from September 1, 1912; to March 1, 1913, of the raw materials used in fertilizer manufacture, the quotations of the New York market being adopted for all materials except acidulated phosphate, rock and ground bone.
2. Upon an allowance of 20 per cent. of the wholesale prices, above mentioned, to cover jobbers' gross profit.

By adding the 20 per cent. allowed for jobbers' gross profit to the wholesale price of the several raw materials, the retail price in original packages at the jobbers' warehouse is obtained.

Since the amount of the several valuable fertilizing constituents in the various raw materials is known, it is a simple matter to determine the corresponding retail value per pound of the valuable fertilizing constituents yielded by each raw material. A schedule of these pound values affords a convenient basis of computation of the value per ton of various fertilizers, whose composition is ascertained by analysis.

The values assigned, for the present ,to the other elements in the cost of the fertilizer at the point of delivery are:

3. For mixing, $1.00 per ton.
4. For bagging, $1.00 per ton, in all cases except those in which the article was sold in original packages; the cost of the package being, in such cases, included in the wholesale price.
5. For agents' commission, 20 per cent. of the cost of the goods f. o. b. at the jobbers' or mixers' warehouse.
6. For freight, $2.00 per ton; the cost of the freight in lots of twelve tons or over, from the seaboard to Harrisburg, averaging $1.88 per ton.

The following valuation of dissolved South Carolina rock illustrates the method:

| Phosphoric Acid. | % | Weight per ton. | |
|---|---|---|---|
| Available, | 14.00 | 280 lbs. at 3c., | $8.40 |
| Insoluble, | 1.00 | 20 lbs. at 1½c., | .30 |
| Retail cash value of ingredients, | | | $8.70 |
| Bagging, | | | 1.00 |
| Cash value of goods ready for shipment, | | | $9.70 |
| Agents' commission, 20 per cent., | | | 1.94 |
| Freight, | | | 2.00 |
| Commercial value per ton, | | | $13.64 |

It is not to be expected, of course, that the valuations thus computed will precisely represent the fair price to be charged for a brand in each locality and in every transaction. Market conditions, competition, distance from factory, all introduce minor variations. Nevertheless, to make the approximation reasonably close the average valuation of a given class of goods ought to agree closely with its ascertained average selling price. Whenever such an agreement is no longer obtained by the use of a schedule, it is evident that the schedule of retail values of the constituents, or the added allowances for mixing, etc., requires revision.

It is needful to note here another factor greatly affecting the practical accuracy of these approximations. Their computation would offer little difficulty and their usefulness be far greater, if, by the ordinary methods of analysis, the exact nature of the ingredients used to supply the several fertilizer constituents, were capable of certain determination. This is, however, possible to-day to only a limited extent. The valuations are therefore based on the assumption that the fertilizers are uniformly compounded from high quality ingredients, such as are commonly employed in the manufacture of fertilizers of the several classes. Consumers should carefully avoid the error of accepting such valuations as infallible; they are not designed to be used for close comparisons of single brands, but only to indicate whether the price asked for a fertilizer is abnormal, assuming good quality for the ingredients used. From this it is clear that, *except as high freights may require, the selling price of a brand should not far exceed the valuation; but that a fertilizer may be made of inferior materials and yet have a high valuation.*

*Except where othrewise expressly stated, the valuations given in the analytical tables are not suited as guide to the prices for goods bought for cash, in large quantity, and directly from the manufacturer, importer, or jobber.*

The valuations used during 1911 were modified for use during 1912 in accordance with the changes in wholesale prices of fertilizing ingredients and to make the valuations more closely follow the selling price.

The following comparative statement shows the valuations and selling prices of the several classes of fertilizers during 1908 to 1912.

| Fertilizers. | Number of samples. | Valuation. | Selling price. | Difference of valuation from selling price. |
|---|---|---|---|---|
| Spring, 1908. | | | | |
| Complete, | 455 | 26.23 | 25.69 | .54 |
| Rock-and-potash, | 108 | 16.24 | 16.96 | —.62 |
| Dissolved bone, | 4 | 23.09 | 21.11 | 1.98 |
| Ground bone, | 21 | 28.96 | 29.04 | —.08 |
| Dissolved rock, | 33 | 14.92 | 14.72 | .20 |
| Fall, 1908. | | | | |
| Complete, | 287 | 23.88 | 22.34 | 1.54 |
| Rock-and-potash, | 104 | 16.17 | 16.43 | —.26 |
| Dissolved bone, | 6 | 26.05 | 22.48 | 3.57 |
| Ground bone, | 30 | 27.90 | 29.18 | —1.28 |
| Dissolved rock, | 49 | 14.86 | 14.31 | .55 |
| Spring, 1909. | | | | |
| Complete, | 426 | 25.31 | 24.88 | —.43 |
| Rock-and-potash, | 111 | 15.94 | 16.98 | —1.40 |
| Dissolved bone, | 8 | 21.57 | 22.25 | —.68 |
| Ground bone, | 24 | 30.28 | 30.70 | —.42 |
| Dissolved rock, | 33 | 13.62 | 14.76 | —1.14 |
| Fall, 1909. | | | | |
| Complete, | 255 | 22.25 | 22.07 | 14 |
| Rock-and-potash, | 92 | 15.50 | 16.10 | —.60 |
| Dissolved bone, | 3 | 22.85 | 24.50 | —1.65 |
| Ground bone, | 26 | 28.71 | 29.39 | —.68 |
| Dissolved rock, | 41 | 14.02 | 13.86 | .16 |
| Spring, 1910. | | | | |
| Complete, | 436 | 26.63 | 25.26 | 1.37 |
| Rock-and-potash, | 123 | 16.08 | 17.16 | —1.08 |
| Dissolved bone, | 8 | 21.47 | 22.17 | —.70 |
| Ground bone, | 24 | 30.27 | 30.19 | .08 |
| Dissolved rock, | 47 | 14.00 | 14.56 | —.56 |
| Fall, 1910. | | | | |
| Complete, | 294 | 22.24 | 21.76 | .48 |
| Rock-and-potash, | 109 | 16.34 | 16.38 | —.04 |
| Dissolved bone, | 4 | 25.70 | 25.80 | —.10 |
| Ground bone, | 29 | 31.10 | 29.98 | 1.12 |
| Dissolved rock, | 32 | 14.15 | 14.01 | .14 |
| Spring, 1911. | | | | |
| Complete, | 485 | 25.95 | 24.97 | .98 |
| Rock-and-potash, | 129 | 15.99 | 17.05 | —1.06 |
| Dissolved bone, | 6 | 23.82 | 20.33 | 3.37 |
| Ground bone, | 23 | 31.47 | 30.93 | .54 |
| Dissolved rock, | 51 | 14.86 | 15.83 | —1.58 |

| Fertilizers. | Number of samples. | Valuation. | Selling price. | Difference of valuation from selling price. |
|---|---|---|---|---|
| Fall, 1911. | | | | |
| Complete, | 292 | 22.33 | 21.72 | .61 |
| Rock-and-potash, | 129 | 16.07 | 16.25 | —.18 |
| Dissolved bone, | 3 | 21.51 | 24.88 | —3.37 |
| Ground bone, | 25 | 31.18 | 31.17 | .01 |
| Dissolved rock, | 42 | 13.78 | 14.00 | .22 |
| Spring, 1912. | | | | |
| Complete, | 470 | 27.24 | 27.64 | .40 |
| Rock-and-potash, | 137 | 16.26 | 18.27 | 2.01 |
| Dissolved bone, | 4 | 18.92 | 20.94 | 2.02 |
| Ground bone, | 24 | 33.26 | 32.81 | .45 |
| Dissolved rock, | 43 | 14.20 | 14.69 | .49 |

The following statement from the weekly reports of the Oil, Paint and Drug Reporter, of New York City, shows the average wholesale prices of fertilizer raw materials from September 1, 1910, to March 1, 1911, and from September 1, 1911, to March 1, 1912.

| Substance. | Amount Priced. | Average price Sept. 1, 1911, to March 1, 1912. | Average price Sept. 1, 1912, to March 1, 1913. | Prices Sept.-March, 1912-1913, in per cent. of prices of 1911-1912. |
|---|---|---|---|---|
| Sulphate of ammonia, | Cwt., | 3.196 | 3.28 | 102.6 |
| Nitrate of soda, | Cwt., | 2.224 | 2.56 | 115.1 |
| Dried blood, H. G., | Unit (20 lbs.), | 3.019 | 2.736 | 90.6 |
| Concentrated tankage, | Unit (20 lbs.), | 2.542 | 2.40 | 94.4 |
| Rough bone, | Ton, | 23.12 | 23.25 | 100.5 |
| Bone meal, | Ton, | 29.05 | 29.25 | 100.7 |
| Fish guano, dry, | Unit (20 lbs.), | 3.228 | 3.113 | 96.3 |
| Phosphate rock, Tenn., | Ton, | 5.25 | 5.25 | 100.0 |
| Acid phosphate, | Unit (20 lbs.), | .525 | .525 | 100.0 |
| Double manure salt, | Ton, | 24.66 | 24.95 | 101.1 |
| Sulphate of potash, | Ton, | 46.58 | 46.80 | 100.4 |
| Kainit, | Ton, | 8.333 | 8.45 | 101.4 |
| Muriate of potash, | Ton, | 38.18 | 38.55 | 100.9 |
| Sulphuric acid, 66 degrees B., | Cwt., | 1.05 | 1.05 | 100.0 |

In ammoniates such as dried blood and fish guano, the unit is of ammonia, of which 82.25 per cent is nitrogen; in acid phosphate the unit is of phosphoric acid (phosphorus pentoxid).

There has been a decided fall in the prices of some of the organic ammoniates, and a slight increase in the cost of nitrogen from inorganic sources. This places the two great classes of ammoniates upon practically the same basis, as concerns commercial values.

Acid phosphate, phosphate rock and sulphuric acid show no change in prices compared with last year.

Potash Salts: The New York Oil, Paint and Drug Reporter gives the following imports of potash salts for the years 1911 and 1912.

| | 1911. | 1912. |
|---|---|---|
| Muriate of potash, | 509,119,173 | 482,265,665 |
| Sulphate of potash, | 121,039,192 | 97,161,010 |
| Kainit and manure salt, | 737,852 | 683,202 |

Composition of Raw Materials.—In order to form a correct idea of the cost per pound of the fertilizer constituents of these materials, it is needful to determine their composition or, in other words, the quantities of valuable constituents each contains. The following table shows the composition of raw materials used in the manufacture of fertilizers. Few analysis of these materials, with the exception of ground bone and dissolved rock, have been made in Pennsylvania. The figures in the following table; include the averages of the results made in Connecticut, New Jersey and Massachusetts during the past year, except in the case of ground bone and dissolved rock phosphates, where Pennsylvania results alone are included.

Composition of Non-Acidulated Fertilizer Ingredients, (Per Cent.)

| Substance. | Number of samples analyzed. | Nitrogen. | Potash. | Total phosphoric acid. |
|---|---|---|---|---|
| Sulphate of ammonia, | 7 | 20.49 | .......... | .......... |
| Nitrate of soda, | 31 | 15.43 | .......... | .......... |
| Dried blood, | 10 | 12.15 | .......... | .......... |
| Ground bone, | 28 | 3.19 | .......... | 22.95 |
| Tankage, | 25 | 6.12 | .......... | 10.13 |
| Ground fish, | .......... | .......... | .......... | .......... |
| Cottonseed meal, | 295 | 6.58 | .......... | .......... |
| Castor pomace, | 3 | 4.69 | 1.02 | 1.75 |
| Sulphate of potash, | 13 | .......... | 49.09 | .......... |
| Muriate of potash, | 33 | .......... | 51.16 | .......... |
| Kainit, | 10 | .......... | 13.62 | .......... |
| Double sulphate of potash and magnesia, | .......... | .......... | .......... | .......... |

## Composition of Acidulated Fertilizer Ingredients. (Per Cent.)

| | Number of samples. | Total phosphoric acid. | Insoluble phosphoric acid. | Nitrogen. |
|---|---|---|---|---|
| Dissolved bone. | 5 | 13.75 | 3.18 | 1.56 |
| Dissolved phosphate rock. | 60 | 15.35 | 1.02 | .......... |

Cost per Pound of Fertilizer Constituents.—With the composition of these raw materials and their price per ton, hundred weight, or other unit of measure as a basis, the wholesale cost per pound of the valuable constituents can readily be calculated. In many cases the ammoniates are quoted "per unit of ammonia," the term unit being equivalent to per cent.; in goods sold by the ton of 2,000 lbs., the unit is equal to 20 lbs., and 20 lbs. of ammonia contain 16,47 lbs. of nitrogen.

In the case of refuse bone-black, unacidulated, the mean, 28.25 per cent. of phosphoric acid, is assumed to represent the average material on the market.

Phosphate rock is sold by the ton of 2,240 lbs., and on the basis of the bone phosphate of lime it contains, with drawbacks for injurious constituents. Bone-phosphate of lime contains 45.8 per cent. of phosphoric acid; therefore, each per cent. of bone phosphate in a long ton is equivalent to 22.4 lbs., and contains 10.26 lbs. of phosphoric acid.

In the wholesale trade, dried blood, azotine ,concentrated tankage and hoof meals are usually sold on the basis of ammonia, disregarding the phosphoric acid present.

Insoluble phosphoric acid in dissolved rock is likewise ommitted from consideration, contracts being based solely upon the "available" phosphoric acid; nor in rock phosphates is any claim made for the small quantities of nitrogen and potash they contain, nor in dissolved bone for the potash present.

Under these conditions, the wholesale cost per pound in New York of the valuable constituents of such materials as furnish but a single fertilizing element, these materials being assumed to be in the state of preparation and in the packing in which the manufacturer purchased them, are given in the following table; also a figure representing a fair retail price at the factory, the materials having undergone no change in treatment or packing and the allowance for expenses and profit in retailing being 20 per cent.

## Wholesale Cost per Pound of Fertilizing Constituents, New York.

### 1. Ingredients Supplying One Constituent.

| Materials. | Constituents Valued. | Wholesale price, cents. | Wholesale price plus 20 per cent., cents. |
|---|---|---|---|
| Sulphate of ammonia, | Nitrogen, | 16.01 | 19.21 |
| Nitrate of soda, | Nitrogen, | 16.59 | 19.91 |
| Dried blood, | Nitrogen, | 16.54 | 19.85 |
| Concentrated tankage, | Nitrogen, | 14.54 | 17.45 |
| Phosphate rock, Tenn., 78 per cent., | Phosphoric acid, total,* | .73 | .88 |
| Acid phosphate, | Phosphoric acid, available, | 2.63 | 3.16 |
| Double sulphate of potash and magnesia, | Potash, | ......... | ......... |
| Sulphate of potash, | Potash, | 4.77 | 5.72 |
| Kainit, | Potash, | 3.11 | 3.73 |
| Muriate of potash, | Potash, | 3.77 | 4.52 |

*The prices of phosphate rock are f. o. b. at the respective points of shipment, not New York. The prices for potash are taken from the schedule of the syndicate, and those of the remainder from the Oil, Paint and Drug Reporter.

The quotations for bone are given without specific reference to quality, so that it is impossible, from these data, fairly to apportion their several wholesale values to the nitrogen and phosphoric acid contained in this material. As compared with tankage, the general tendency is to assign a higher commercial rating to the phosphoric acid in bone, and to nitrogen, a rating not very different from that given in tankage.

In former years, the value assigned to the nitrogen has been the same as that quoted on crushed tankage, c. a. f. Baltimore. In later years, quotations for both crushed tankage and ground tankage have not been available, and for that reason, the value of bone nitrogen is based upon the quotations for concentrated tankage.

In earlier years, quotations on ground tankage have been about 5 per cent. in advance of those on concentrated tankage, also quotations on crushed tankage were on an average 12.67 per cent. in advance of these on ground tankage. Increasing the price of concentrated tankage by these percentages, we have $2.83 per unit of ammonia as the value assigned to the nitrogen in bone.

This is equivalent to $3.44 per unit of nitrogen.

The average composition of the ground bone and bone meal samples analyzed last fall in Pennsylvania was: Phosphoric acid, 22.95 per cent.; nitrogen 3.19 per cent.

The prepared bone contains less fat and moisture, and often less nitrogen than the ordinary rough bone, but these differences tend, in a measure, to neutralize each other. Assuming for the rough bone quoted in the New York market the same composition as the bone meal sold in Pennsylvania, and for the value of the nitrogen $3.44

per unit, as previously stated, the values per pound of the several constituents would be:

### Wholesale Cost per Pound of Fertilizer Constituents, New York.

### II. Bone.

| Materials. | Constituent Valued. | Wholesale price, cents. | Wholesale price, plus 20 per cent. |
|---|---|---|---|
| Rough bone, | Nitrogen, | 17.20 | 20.64 |
| | Phosphoric acid, | 2.68 | 3.22 |
| Ground bone, | Nitrogen, | 17.89 | 21.48 |
| | Phosphoric acid, | 2.79 | 3.35 |

### Valuation in Neighboring States.

It is desirable, from all points of view, that the schedules of valuation throughout a district in which similar market conditions prevail, should differ as little as possible. It has been our practice in the past, to conform our schedule to that adopted after very careful cooperative study of the market conditions for each year, by the New England States, New York and New Jersey, except where the peculiar conditions of our markets have been made the valuations diverge too largely from the actual selling prices, as in the case of ground bone and dissolved rock phosphates. The schedules for these States for 1912 and 1913 are as follows:

### Trade Values Adopted by the New England States and New Jersey.

| | Cents Per Pound. | | Values in 1913 in per cent. of those in 1912. |
|---|---|---|---|
| | 1912. | 1913. | |
| Nitrogen, | | | |
| In nitrates, | 16½ | 18½ | 112.1 |
| In ammonium salts, | 16½ | 18½ | 112.1 |
| In dry and fine ground fish and blood, | 22 | 20 | 90.9 |
| In fine bone and tankage and mixed fertilizers, | 19 | 19 | 100.0 |
| In coarse bone and tankage, | 15 | 15 | 100.0 |
| Phosphoric Acid: | | | |
| Water soluble, | 4½ | 4½ | 100.0 |
| Citrate soluble, | 4 | 4 | 100.0 |
| In fine ground bone and tankage, | 4 | 4 | 100.0 |
| In coarse bone and tankage, | 3½ | 3½ | 100.0 |
| In mixed fertilizers, insoluble, | 2 | 2 | 100.0 |
| Potash: | | | |
| In forms free from muriate, | 5¼ | 5¼ | 100.0 |
| As muriate, | 4¼ | 4¼ | 100.0 |

## Valuations in Pennsylvania.

For reasons stated on the previous page, the New England schedule has been followed in the case of mixed fertilizers and dissolved bones.

In the case of the dissolved rocks, the wholesale prices of raw materials used in their manufacture and of the available phosphoric acid itself, having shown no material change, the values used in the Pennsylvania schedule for 1912 are continued for use during the present year.

With respect to the potash and nitrate salts, the experience of recent years has shown a growing increase in the proportion of the official samples that represent direct cash purchases in large quantities. The result has been that the commercial valuations, based upon the conditions and costs of sale in small quantities, through local agents and on time, came to be, in a large fraction of the cases represented by these salts whose analyses are reported in the miscellaneous group, strikingly higher than the selling prices quoted. *For this reason, it has appeared needful to proceed, hereafter, upon the assumption that all potash and nitrate salts sold unmixed as such, have been purchased at what an virtually jobbers 'prices plus freight, and to adopt corresponding pound values. In the case, however, of potash and nitrogen in mixed fertilizers, the computation will be made as heretofore, upon the assumed basis of sale on time, in small quantities and* through local dealers. ............... .. .... ... ........ ......

Buyers who are interested in the comparative jobbing prices of other materials, will find the data in the preceding pages.

The entire schedule adopted for use in this State is presented in the following table.

### Pennsylvania Schedule of Values for Fertilizer Ingredients, 1913.

| | Cents Per Pound. |
|---|---|
| **Nitrogen:** | |
| In ammonia salts, | 18½ |
| In nitrates, | 18½ |
| In meat, dried blood and mixed fertilizers, | 19 |
| In fine ground bone and tankage, | 17 |
| In coarse bone and tankage, | 15 |
| **Phosphoric Acid:** | |
| Available, in bone fertilizers, | 4½ |
| Available, in rock fertilizers, | 5 |
| Insoluble in ammonium citrate, in bone fertilizers, | 2 |
| Insoluble in ammonium citrate, in rock fertilizers, | 1½ |
| In fine bone, tankage and fish, | 3½ |
| In coarse bone and tankage, | 2½ |
| **Potash:** | |
| In high grade sulphate or forms free from muriate, | 5¼ |
| As muriate, | 4¼ |

*Potash in excess of that equivalent to the chlorin present, will be valued as sulphate, and the remainder as muriate.* The analytical tables frequently show little or no potash reported as sulphate, although the full percentage guaranteed is reported present ,and although the manufacturer has guaranteed that it was introduced as sulphate. This discrepancy between analytical report and guaranty may be due to the rule of practice stated in the first sentence of this paragraph, and not to any act of bad faith on the part of the manufacturer. The rule of practice is adopted chiefly for the reason that plants injured, like tobacco and sometimes potatoes, by an excess of chlorin, is injured equally, whether the chlorin be introduced as muriate of potash, as common salt, or as magnesium chloride. At present prices for the two potash salts, muriate and sulphate, the only weightly reason for introducing the more costly sulphate, is to insure the purchaser of tobacco and potato fertilizers against possible injury by chlorin. Under our system of valuation, the manufacturer must exclude chlorin from every source to gain the valuation advantage from his use of sulphate of potash.

In certain cases where specific claim is made by the manufacturer that potash has been added as carbonate, potash in excess of that equivalent to soluble chlorides and soluble sulphates will be valued as carbonate.

Nitrogen in mixed fertilizers will be valued as derived from the best sources of organic nitrogen, unless clear evidence to the contrary is obtained.

Phosphoric acid in mixed fertilizers is valued at bone phosphoric acid prices, unless clearly found to be derived from rock phosphate.

Bone is sifted into two grades of fineness: Fine, less than 1-50 inch in diameter; coarse, over 1-50 inch in diameter.

The result obtained by the use of this schedule does not cover the items of mixing, bagging, freight and agents' commission. To cover these, allowances are made as follows:

For freight, an allowance of $2.00 per ton on all fertilizers.

For bagging, an allowance of $1.00 per ton on all fertilizers, except when sold in original packages.

For mixing, an allowance of $1.00 per ton on complete fertilizers and rock-and-potash goods.

For agents' commission, an allowance of 20 per cent. is added to the cash value of the goods ready for shipment.

## FERTILIZER ANALYSES JANUARY 1, TO AUGUST 1, 1913.

Since January 1, 1913, there have been received from authorized sampling agents two thousand two hundred and thirty-three fertilizer samples, of which seven hundred and sixty-nine were subjected to analysis. Preference is given to those which have not been recently analyzed. In cases where two or more samples representing the same brand were received, equal portions from several samples were united, and the composite sample was subjected to analysis.

The samples analyzed group themselves as follows: 531 complete fertilizers, furnishing phosphoric acid, potash and nitrogen; 4 dissolved bones, furnishing phosphoric acid and nitrogen; 140 rock-and potash fertilizers, furnishing phosphoric acid and potash, 43 acidulated rock phosphates, furnishing phosphoric acid only; 32 ground bones, furnishing phosphoric acid and nitrogen, and 19 miscellaneous samples, which group includes substances not properly classified under the foregoing heads.

The determinations to which a complete fertilizer is subjected are as follows: (1) Moisture, useful for the comparison of analyses, for indication of dry condition and fitness for drilling, and also of the conditions under which the fertilizer was kept in the warehouse. (2) Phosphoric acid—total and insoluble; that is, that portion not soluble in water nor in warm ammonium citrate solution (a solution supposed to represent the action of plant roots upon the fertilizer), which is assumed to have little immediate food value. By difference, it is easy to compute the so-called "available" phosphoric acid. (3) Potash soluble in water—most of that present in green sand marl and crushed minerals, and even some of that present in vegetable materials such as cotton-seed meal, not being included because insoluble in water ever after long boiling. (4) Nitrogen—This element is determined by a method which simply accounts for all present, without distinguishing between the quantities present in the several forms of ammonium salts, nitrates or organic matter. (5) Chlorin—this determination is made to afford a basis for estimating the proportion of the potash that is present as chlorid or muriate, the cheaper source. The computation is made on the assumption that the chlorin present, unless in excess, has been introduced in the form of muriate of potash; but doubtless there are occasional exceptions to this rule. One part of chlorin combines with 1.326 parts of potash to form the pure muriate; knowing the chlorin, it is, therefore, easy to compute the potash equivalent thereto. (7) In the case of ground bone, the state of sub-division is determined by sifting through accurately made sieves; the cost of preparation and especially the promptness of action of bone in the soil depend very largely on the fineness of its particles, the finer being much more quickly useful to the plant.

The preceding paragraph sets forth the nature of the examinations given to the several classes of fertilizers under the laws in force prior to the present year. The legislation of 1909 has made needful, however, some additional tests. Section 4, of the Act of May 1, 1909, prohibits the sale of "pulverized leather, hair, ground hoof, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact." All nitrogenous fertilizers have, therefore, been submitted to a careful microscopic examination, at the time of preparing the sample for analysis, to detect the presence of the tissues characteristic of the several materials above named. The act of April 23, 1909, makes it unlawful to use the word "bone" in connection with, or as part of the name of any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone. All fertilizers in whose name the word "bone" appears, were therefore examined by microscopic and chemical methods to determine, so far as possible with present knowledge, the nature of the ingredient or ingredients supplying the phosphoric acid. It is a fact, however, well known to fertilizer manufacturers and which should be equally understood by the consumer, that it is, in certain cases, practically impossible to determine the source of the phosphoric acid by an examination of the finished fertilizer. The microscope shows clearly the structure of raw bone, but does not make it possible to discriminate between thoroughly acidulated bone and acidulated rock. The ratio of nitrogen to phosphoric acid in a raw bone—and only such bone as has not been deprived of any considerable proportion of its nitrogenous material by some manufacturing process can properly be called "pure animal bone"—is about 1:8; in cases where the ratio of nitrogen to phosphoric acid exceeds 8, it is clear that part, at least, of the phosphoric acid has been supplied by something else than pure animal bone; but, inasmuch as nitrogen may have been introduced in some material other than bone and no longer detectible by the microscope, the presence of nitrogen and phosphoric acid in the proportions corresponding to those of bone is not proof positive that they have been supplied by bone. Finally, the differences in the iron and silica content of bone and rock respectively, afford means of distinction useful in some cases; the usefulness of this distinction is limited, however, by the facts that kitchen bone frequently contains earthly impurities rich in iron and silica, and that earthly fillers can legally be used in fertilizers and are in fact considerably used therein both as "make-weights" and as "conditioners," or materials introduced to improve the drilling qualities of the goods. The fact that the phosphoric acid in bone and rock are identical in character is probably so well known as to require no detailed consideration in this connection.

The law having required the manufacturer to guarantee the amount of certain valuable ingredients present in any brand he may put upon the market, chemical analysis in employed to verify the guaranties stamped upon the fertilizer sacks. It has, therefore, been deemed desirable in this report to enter the guaranty filed by the manufacturer in the office of the Secretary of Agriculture, in such connection with the analytical results that the two may be compared. An unfortunate practice has grown up among manufacturers of so wording the guaranty that it seems to declare the presence in goods of an amount of valuable constituent ranging from a certain minimum to a much higher maximum; thus, "Potash, 2 to 4 per cent." is a guaranty not infrequently given. In reality, the sole guaranty is for 2 per cent. The guaranteed amounts given for each brand in the following tables, are copied from the guaranties filed by the maker of the goods with the Secretary of Agriculture, the lowest figure given for any constituent being considered to be the amount guaranteed. For compactness and because no essentially important fact is suppressed thereby, the guaranties for soluble and reverted phosphoric acid have not been given separately, but are combined into a single guaranty for available phosphoric acid; in cases where the maker's guaranty does not specifically mention available phosphoric acid, the sum of lowest figures given by him for soluble and reverted phosphoric acid is used. The law of 1879 allowed the maker to express his guaranty for nitrogen either in terms of that element or in terms of the ammonia equivalent thereto; since ammonia is composed of three parts of hydrogen and fourteen parts of nitrogen it is a very simple matter to calculate the amount of one, when the amount of the other is given; the amount of nitrogen multiplied by 1.214 will give the corresponding amount of ammonia, and the amount of ammonia multiplied by 0.824 will give the corresponding amount of nitrogen. In these tables, the expression is in terms of nitrogen. The laws of 1901 and 1909 abolished the alternative and required that the quantity shall be given in terms of nitrogen.

Many manufacturers after complying with the terms of the law, insert additional items in their guaranties, often with the result of misleading or confusing the buyer; the latter will do well to give heed to those items only that are given as the law requires and that are presented in these tables:

A summary of the analyses made this season is presented as follows:

SUMMARY OF ANALYSES MADE THIS SEASON.

| | Complete. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Number of analyses, | 531 | 140 | 4 | 43 | 32 |
| Moisture, per cent., | 7.87 | 8.26 | 7.35 | 7.98 | 5.96 |
| Phosphoric acid: | | | | | |
| Total, per cent., | 9.71 | 10.68 | 14.63 | 15.85 | 22.14 |
| Available, per cent., | 7.87 | 9.83 | 10.52 | 14.82 | .......... |
| Insoluble, per cent., | 1.60 | .85 | 4.11 | 1.03 | .......... |
| Potash, per cent., | 5.41 | 4.62 | .......... | .......... | .......... |
| Nitrogen, per cent., | 1.61 | .......... | 1.26 | .......... | 3.86 |
| Mechanical analyses of bone: | | | | | |
| Fine, | .......... | .......... | .......... | .......... | 56.00 |
| Coarse, | .......... | .......... | .......... | .......... | 44.00 |
| Commercial valuation,* | 26.44 | 16.52 | 21.63 | 14.25 | 32.50 |
| Average selling price,* | 25.08 | 16.75 | 18.55 | 16.96 | 33.84 |

*Dollars per ton.

"For the purpose of indicating more specifically to the eye, cases deficient in guarantee, an asterisk has been affixed in the analytical tables where the ingredient has been found less in quantity than the manufacturer guaranteed. Too great emphasis should not be placed upon very slight deficiencies, because very slight imperfections in mixing and slight variations in analysis are practically unavoidable. The asterisk has been used therefore, only in cases where the deficiencies amount to 0.2 per cent, or more, except where nitrogen has been guaranteed in amounts not higher than 1.0 per cent., in which case an asterisk has been affixed where the deficiency amounts to 0.1 per cent. or more."

The cases of departure of goods from their guaranteed composition observed this season, including only those cases in which it amounted to two-tenths per cent. or more, were as follows:

Summary of Instances of Deficiency from Guaranty,

| | Complete fertilizer. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Deficient in four constituents, | 0 | 0 | 0 | 0 | 0 |
| Deficient in three constituents, | 8 | .......... | .......... | .......... | .......... |
| Deficient in two constituents, | 29 | 8 | 1 | 3 | 1 |
| Deficient in one constituent, | 135 | 29 | 1 | 6 | 7 |
| Total number of samples in whcih deficiencies occur, | 172 | 37 | 2 | 9 | 8 |

The cases of deficiency noted during the past eleven seasons in the composition of goods as compared with their guaranties, expressed in percentage of the total number of goods of each class analyzed, are as follows:

### Percentage of deficiency, 1908-1913.

| | Spring, 1908. | Fall, 1908. | Spring, 1909. | Fall, 1909. | Spring, 1910. | Fall, 1910. | Spring, 1911. | Fall, 1911. | Spring, 1912. | Spring, 1913. |
|---|---|---|---|---|---|---|---|---|---|---|
| Complete fertilizers, | 40.0 | †40.0 | 39.5 | 46.3 | 28.9 | 35.9 | 45.1 | 46.9 | 39.0 | 32.3 |
| Dissolved bone, | ‡50.0 | 16.6 | 25.0 | * | 37.5 | 25.0 | 16.6 | 100.00 | 50.0 | 50.0 |
| Rock and potash, | 39.0 | 33.8 | 36.2 | 30.4 | 25.2 | 37.0 | 27.1 | 43.4 | 33.6 | 26.4 |
| Dissolved rock, | 21.2 | 28.5 | 33.3 | 19.5 | 4.3 | 6.3 | 5.9 | 11.9 | 12.5 | 20.9 |
| Ground bone, | 38.0 | 40.0 | 20.8 | 38.4 | 29.17 | 27.6 | 47.8 | 20.0 | 29.2 | 25.0 |
| All classes except miscellaneous, | 38.8 | 35.3 | 37.6 | 39.6 | 26.5 | 33.5 | 38.7 | 46.0 | 36.0 | 30.4 |

*Only two samples analyzed for which no guarantees are reported.
†Only three samples analyzed.
‡Only four samples analyzed.

A comparison of the average composition of all samples of complete fertilizers for which guaranties are recorded with the average of the corresponding guaranties, for several seasons past, including those of this season, follows:

### Average Composition and Guaranty Compared.

| | Average composition. Per cent. | Average guaranty. Per cent. |
|---|---|---|
| **Spring, 1908.** | | |
| Phosphoric acid: | | |
| Total, | 10.07 | 8.91 |
| Available, | 8.29 | 7.61 |
| Potash, | 5.04 | 4.51 |
| Nitrogen, | 1.64 | 1.59 |
| **Fall, 1908.** | | |
| Phosphoric acid: | | |
| Total, | 10.29 | 9.31 |
| Available, | 8.29 | 7.96 |
| Potash, | 3.24 | 2.94 |
| Nitrogen, | 1.24 | 1.23 |
| **Spring, 1909.** | | |
| Phosphoric acid: | | |
| Total, | 9.83 | 8.98 |
| Available, | 8.07 | 7.66 |
| Potash, | 5.07 | 4.80 |
| Nitrogen, | 1.67 | 1.00 |
| **Fall, 1909.** | | |
| Phosphoric acid: | | |
| Total, | 10.13 | 9.34 |
| Available, | 8.27 | 8.08 |
| Nitrogen, | 1.33 | 1.26 |
| Potash, | 3.41 | 3.12 |

## Average Composition and Guaranty Compared—Continued.

| | Average composition. Per cent. | Average guaranty. Per cent. |
|---|---|---|
| **Spring, 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.80 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Fall. 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.72 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Spring, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.86 | 8.96 |
| Available, | 8.31 | 7.86 |
| Potash, | 4.97 | 4.65 |
| Nitrogen, | 1.58 | 1.54 |
| **Fall, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.59 | 9.09 |
| Available, | 8.20 | 7.87 |
| Potash, | 3.63 | .339 |
| Nitrogen, | 1.12 | 1.19 |
| **Spring, 1912.** | | |
| Phosphoric acid: | | |
| Total, | 9.51 | 8.82 |
| Available, | 8.09 | 7.78 |
| Potash, | 5.34 | 5.05 |
| Nitrogen, | 1.56 | 1.58 |
| **Spring, 1913.** | | |
| Phosphoric acid: | | |
| Total, | 9.71 | 8.92 |
| Available, | 8.11 | 7.37 |
| Potash, | 5.41 | 5.17 |
| Nitrogen, | 1.61 | 1.62 |

It is of interest to note how closely the series of valuations based upon the wholesale price of raw materials in the principal markets during the most important buying season and upon certain average allowances for expenses and profits on the part of the mixer and jobber, coincides with the retail prices later ascertained. A comparison for several seasons past is given below:

## Comparison of Selling Price and Valuation, 1908-1913.

| | Selling price. | Valuation. | Excess of valuation over selling price. |
|---|---|---|---|
| **Complete fertilizers:** | | | |
| 1908, Spring, | 25.69 | 26.23 | .54 |
| Fall, | 22.34 | 23.88 | 1.54 |
| 1909, Spring, | 24.88 | 25.31 | .43 |
| Fall, | 22.07 | 22.25 | .14 |
| 1910, Spring, | 25.26 | 26.63 | 1.43 |
| Fall, | 21.76 | 22.24 | .48 |
| 1911, Spring, | 24.97 | 25.95 | .98 |
| Fall, | 21.73 | 22.33 | .61 |
| 1912, Spring, | 27.64 | 27.24 | —.40 |
| 1913, Spring, | 25.08 | 26.44 | 1.36 |
| **Dissolved bone:** | | | |
| 1908, Spring, | 21.11 | 23.09 | 1.98 |
| Fall, | 22.48 | 26.05 | 3.57 |
| 1909, Spring, | 22.25 | 21.57 | —.68 |
| Fall, | 24.50 | 22.85 | —1.65 |
| 1910, Spring, | 22.17 | 21.47 | —.70 |
| Fall, | 25.80 | 25.70 | —.10 |
| 1911, Spring, | 20.33 | 23.82 | 3.49 |
| Fall, | 24.88 | 21.51 | —3.37 |
| 1912, Spring, | 20.94 | 18.92 | 2.82 |
| 1913, Spring, | 18.55 | 21.63 | 3.08 |
| **Rock and potash:** | | | |
| 1908, Spring, | 16.86 | 16.24 | —.62 |
| Fall, | 16.43 | 16.17 | —.26 |
| 1909, Spring, | 16.98 | 15.94 | 1.04 |
| Fall, | 16.10 | 15.50 | —.60 |
| 1910, Spring, | 17.16 | 16.08 | —1.08 |
| Fall, | 16.38 | 16.34 | —.04 |
| 1911, Spring, | 17.05 | 15.99 | —1.06 |
| Fall, | 16.25 | 16.07 | —.18 |
| 1912, Spring, | 18.17 | 16.26 | —1.91 |
| 1913, Spring, | 16.75 | 16.52 | —.23 |
| **Dissolved rock:** | | | |
| 1908, Spring, | 14.72 | 14.92 | .20 |
| Fall, | 14.31 | 14.86 | .55 |
| 1909, Spring, | 14.76 | 13.62 | —1.14 |
| Fall, | 13.86 | 14.02 | .16 |
| 1910, Spring, | 14.56 | 14.00 | —.56 |
| Fall, | 14.01 | 14.15 | .14 |
| 1911, Spring, | 15.88 | 14.26 | —1.58 |
| Fall, | 14.00 | 13.78 | .22 |
| 1912, Spring, | 14.69 | 14.20 | —.49 |
| 1913, Spring, | 13.96 | 14.25 | .29 |
| **Ground bone:** | | | |
| 1908, Spring, | 29.04 | 28.96 | —.08 |
| Fall, | 28.18 | 17.90 | —1.28 |
| 1909, Spring, | 30.70 | 30.28 | —.42 |
| Fall, | 29.39 | 28.71 | —.68 |
| 1910, Spring, | 30.19 | 30.27 | .08 |
| Fall, | 29.98 | 31.10 | 1.12 |
| 1911, Spring, | 30.93 | 31.47 | .54 |
| Fall, | 31.17 | 31.18 | .01 |
| 1912, Spring, | 32.81 | 33.26 | .45 |
| 1913, Spring, | 33.86 | 32.50 | —1.36 |

## MATERIALS USED IN FERTILIZERS.

The microscopic examination of the nitrogenous fertilizers for leather, hair, and other materials the use of which without notice is prohibited by the Act of May 1, 1909, revealed in no case such quantity of any of these substances as might not fairly be regarded as an accidental trace. No instance has been reported by the sampling agents in which a declaration of the presence of such material has been made. It is, however, a matter of quite general knowledge that substances of this kind are being largely used in fertilizer mixtures; but, in most cases at least, only after such treatment as results in the destruction of the characteristic tissues and, at the same time, wholly or partly in that of the organic compounds originally present.

In conformity with the requirements of the Act of April 23, 1909, many firms dropped from the brand names of goods manufactured by them the word "bone" hitherto forming part of said names. Where such change in name appears, it may be taken as evidence that the phosphoric acid is derived, at least in part, from something else than bone.

## ORGANIZATION OF THE WORK.

In conclusion, I would state that the work of the season has been performed under my direction, as follows:

The nitrogen determinations by W. Thomas, B. S.; those of total phosphoric acid by P. W. Clemmer, B. S.; of insoluble phosphoric acid by H. D. Edmiston and F. N. Crawford, B. S.; of potash by E. S. Erb, M. S.; computations by Miss Verna Bryce, and chlorin, by Charles Kern; and the preparation of samples, care of records, and the detail of the compilation of this bulletin, by G. C. Given, M. S. To these trained and experienced assistants, my acknowledgments are due for loyal and efficient service.

# COMPLETE

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA. | | |
| 554 | High Grade Potato Phosphate, | Wm. H. Yoder, Trexlertown, | 7.65 |
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | | |
| 1112<br>1252 | †Complete Manure with 10% Potash, | Sam'l H. Wolf, Stevens,<br>E. S. Zehner, Tamaqua, | 7.35 |
| 199<br>1406 | †High Grade Potash Compound, | W. V. Shirk, Oakland Mills,<br>Jno. P. Jones Hdwe. Co., Summerville. | 10.00 |
| 422<br>159<br>507 | †Special Potash Mixture, | Jno. B. Buckman, Newtown,<br>Linesville Coal, Lime and Cement Co., Linesville.<br>Jno. H. Reed, Cressona, | 9.18 |
| 1867 | Superior Compound, | Paxton Flour and Feed Co., Bowmansdale. | 5.75 |
| 421<br>838 | †Top Dresser for Grass, | Jno. B. Buckman, Newtown,<br>J. B. Curry Est., Swatara, | 7.35 |
| 456<br>1497 | †Bradley's Bay State, | A. W. Sandt, Martins Creek,<br>Chas. McDowell, Mansfield, | 5.30 |
| 1065<br>1050<br>1121 | †Bradley's B. D. Guano, | S. K. Smith & Son, New Bethlehem,<br>A. F. Gault, Bentleyville,<br>J. S. Cole, Milleville, | 9.45 |
| 1069<br>1749<br>1614 | †Bradley's B. D. Sea Fowl Guano, | Anderson Hdwe. Co., New Bethlehem.<br>Geo. Ifft & Sons, Evans City,<br>Frank Hagenbach, Danville, R. No. 4. | 8.90 |
| 1039<br>1825 | †Bradley's Greyhound Fertilizer, | J. G. Leighton, Tunkhannock,<br>Paxton Flour and Feed Co., Bowmansdale. | 6.98 |
| 1036<br>1824 | †Bradley's King Philip, | J. G. Leighton, Tunkhannock,<br>Paxton Flour and Feed Co., Bowmansdale. | 12.25 |
| 675 | Bradley's Maize Producer, | Wysox Coal and Hay Co., Wysox, | 8.22 |
| 1750 | Bradley's New Method Fertilizer, | Geo. Ifft & Sons, Evans City, | 7.65 |
| 1464 | Bradley's New Rival Fertilizer, | G. R. Andrews, Enon Valley, | 5.90 |
| 1051<br>1646 | †Bradley's Niagara Phosphate, | A. F. Gault, Bentleyville,<br>Punxsutawney Planing Mill Co., Punxsutawney. | 8.42 |
| 830 | Bradley's Potato and Vegetable Manure, | Benj. H. Gibson, Hydetown, | 8.95 |
| 2225 | Bradley's Superior Compound, | Otto Braun, Germania, | 11.25 |
| 1353 | Bradley's Tobacco Manure Sulphate, | G. B. Murphy, Red Lion, R. No. 1, | 6.65 |
| 1717 | Bradley's Unicorn, | Deerfield Milling Co., Knoxville, | 8.00 |
| 664<br>1122 | †Bradley's Weymouth Staple Phosphate, | R. C. King, Ulster,<br>J. S. Cole, Millville, | 7.73 |
| 1217<br>569<br>1441 | †Canton Chemical Co's CCC Special Compound. | W. B. Winey, Middleburg,<br>H. L. Orr, Tyrone,<br>King Bros., Uniontown, | 9.15 |
| 354<br>245<br>425 | †Canton Chemical Baker's Special Wheat, Corn and Grass Mixture. | T. J. Jacobs, Somerfield,<br>H. L. Lindner, Milton,<br>Jno. B. Buckman, Newtown, | 7.65 |
| 1443<br>1577 | †Canton Chemical Baker's Standard High Grade Guano. | King Bros., Uniontown,<br>J. P. Herman, Gordonville, | 7.65 |
| 655<br>510<br>1536 | †Canton Chemical Eagle Phosphate, | F. L. Kehres & Son, Rebuck,<br>Thomas Kramer, Schuylkill Haven,<br>F. S. Lewis, Quakertown, | 9.25 |
| 1732 | Canton Chemical Harrow Brand Crop Grower. | Wm. Gates Estate, Kittanning, | 9.10 |
| 424<br>244<br>544 | †Canton Chemical Potato Manure, | Jno. B. Buckman, Newtown,<br>H. L. Lindner, Milton,<br>Geo. F. Hartman, Centre Valley, | 8.18 |
| 423<br>246<br>1575 | †Canton Chemical Resurgam Guano, | Jno. B. Buckman, Newtown,<br>H. L. Lindner, Milton,<br>J. P. Herman, Gordonville, | 10.03 |
| 2075 | Crocker's Ammoniated Superphosphate, | J. W. Hartwell, New Wilmington, | 7.03 |
| 464 | Crocker's Century Fertilizer, | Peter Haughenbach, Nazareth, | 5.60 |
| 1470 | Crocker's Colonial Fertilizer, | J. E. Waters, Jamestown, | 6.33 |
| 607<br>162<br>1054 | †Crocker's Complete Manure, | Houck & Henry, New Berlinville,<br>Linesville Coal, Lime and Cement Co., Linesville.<br>Bentleyville Hdw. Co., Bentleyville, | 10.53 |

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†Composite sample.

# FERTILIZERS.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 5.22 | 4.00 | 2.11 | *7.33 | 8.00 | 9.48 | ...... | *9.48 | 10.00 | 1.61 | 1.50 | 27.75 | 28.00 | 554 |
| 6.89 | 6.00 | .98 | 7.87 | 7.00 | 9.08 | ...... | *9.08 | 10.00 | *2.68 | 3.29 | 33.50 | 35.00<br>33.50 | 1112<br>1252 |
| 8.21 | 8.00 | 1.62 | 9.83 | 9.00 | 10.02 | ...... | 10.02 | 10.00 | 1.57 | 1.65 | 30.85 | .....<br>24.00 | 199<br>1406 |
| 8.84 | 9.00 | 1.46 | 10.30 | 10.00 | 7.54 | ...... | 7.54 | 7.00 | .86 | .82 | 25.70 | 28.00<br>26.00<br>23.00 | 422<br>159<br>507 |
| 8.50 | 8.00 | 1.56 | 10.06 | 9.00 | 4.31 | ...... | 4.31 | 4.00 | 1.83 | 1.65 | 26.65 | 24.00 | 1867 |
| 8.68 | 8.00 | .82 | 9.50 | 9.00 | 5.71 | ...... | 5.71 | 5.00 | *4.66 | 4.94 | 40.69 | 42.00<br>36.00 | 421<br>838 |
| 5.29 | 5.00 | 1.34 | 6.63 | 6.00 | 10.88 | ...... | 10.88 | 10.00 | 1.69 | 1.65 | 29.34 | 29.00<br>28.00 | 456<br>1497 |
| 8.27 | 8.00 | 1.48 | 9.75 | 9.00 | 4.34 | ...... | 4.34 | 4.00 | .93 | .82 | 22.08 | 25.00<br>24.50<br>18.00 | 1050<br>1065<br>1121 |
| 7.89 | 8.00 | 1.99 | 9.88 | 9.00 | 2.19 | ...... | 2.19 | 1.50 | 2.03 | 2.06 | 25.02 | 25.00<br>25.00 | 1069<br>1749 |
| 6.73 | 6.00 | 1.21 | 7.94 | 7.00 | 11.18 | ...... | 11.18 | 10.00 | *3.01 | 3.29 | 36.97 | .....<br>35.00<br>35.00 | 1614<br>1039<br>1825 |
| 8.20 | 8.00 | 1.72 | 9.92 | 9.00 | 2.77 | ...... | 2.77 | 2.00 | 1.15 | 1.03 | 21.63 | 22.00<br>19.00 | 1036<br>1824 |
| *6.86 | 8.00 | 3.55 | 10.41 | 9.00 | 7.07 | ...... | 7.07 | 6.00 | 2.21 | 2.06 | 30.31 | 28.00 | 675 |
| 8.22 | 8.00 | .65 | 8.87 | 9.00 | 2.32 | ...... | 2.32 | 2.00 | .83 | .82 | 19.30 | 22.00 | 1750 |
| 6.69 | 6.00 | 1.42 | 8.11 | 7.00 | 5.92 | ...... | 5.92 | 5.00 | 1.51 | 1.23 | 24.78 | 25.00 | 1464 |
| 6.86 | 7.00 | 1.49 | 8.35 | 8.00 | 1.44 | ...... | 1.44 | 1.00 | .95 | .82 | 17.91 | 21.00<br>20.00 | 1051<br>1646 |
| 7.95 | 8.00 | 1.55 | 9.50 | 9.00 | 5.30 | 1.12 | *6.42 | 7.00 | *2.45 | 3.29 | 31.23 | 38.00 | 830 |
| 8.66 | *9.00 | 1.07 | *9.73 | 10.00 | 6.37 | ...... | *6.37 | 7.00 | 1.28 | .82 | 25.96 | 28.00 | 2225 |
| 3.22 | 3.00 | .35 | *3.57 | 4.00 | .66 | 5.64 | 6.30 | 5.50 | *4.22 | 4.53 | 34.76 | 35.00 | 1353 |
| 8.50 | 8.00 | 1.33 | 9.83 | 9.00 | 2.81 | ...... | 2.81 | 2.00 | 1.75 | 1.65 | 24.56 | 21.00 | 1717 |
| 8.15 | 8.00 | 1.83 | 9.98 | 9.00 | 10.57 | ...... | 10.57 | 10.00 | 1.57 | 1.65 | 31.44 | 30.00<br>26.00 | 664<br>1122 |
| 8.93 | 8.00 | 1.40 | 10.33 | 9.00 | 6.04 | ...... | 6.04 | 6.00 | 2.14 | 2.06 | 30.18 | 28.00<br>30.00<br>30.00 | 1217<br>569<br>1441 |
| 9.00 | 9.00 | 1.56 | 10.56 | 10.00 | 2.37 | ...... | 2.37 | 2.00 | .87 | .82 | 20.60 | 24.00<br>18.00<br>24.00 | 854<br>245<br>425 |
| 8.02 | 8.00 | 1.72 | 9.74 | 9.00 | 3.18 | ...... | 3.18 | 3.00 | 2.16 | 2.06 | 26.49 | 30.00<br>25.00 | 1448<br>1577 |
| 7.70 | 7.00 | 1.33 | 9.03 | 8.00 | 1.34 | ...... | 1.34 | 1.00 | .85 | .82 | 18.16 | 17.50<br>18.00<br>20.00 | 655<br>510<br>1536 |
| 8.16 | 8.00 | 1.40 | 9.56 | 9.00 | 2.25 | ...... | 2.25 | 1.00 | .91 | .82 | 19.78 | 19.00 | 1732 |
| 6.86 | 6.00 | 1.44 | 8.30 | 7.00 | 5.49 | ...... | 5.49 | 5.00 | 1.28 | 1.23 | 23.62 | 26.00<br>22.00<br>23.00 | 424<br>244<br>544 |
| 8.38 | 8.00 | 1.53 | 9.91 | 9.00 | 4.54 | ...... | 4.54 | 4.00 | .87 | .82 | 22.18 | 28.00<br>19.00<br>23.50 | 423<br>246<br>1575 |
| 8.92 | 9.00 | 1.55 | 10.47 | 10.00 | 4.11 | ...... | 4.11 | 2.00 | *1.70 | 2.47 | 26.17 | 38.00 | 2075 |
| 5.30 | 5.00 | 1.14 | 6.44 | 6.00 | 10.02 | ...... | 10.02 | 10.00 | 2.05 | 1.65 | 29.91 | 25.00 | 464 |
| 6.52 | 6.00 | 1.39 | 7.91 | 7.00 | 12.54 | ...... | 12.54 | 10.00 | 2.69 | 2.47 | 36.78 | 32.00 | 1470 |
| 8.09 | 8.00 | 1.34 | 9.43 | 9.00 | 4.19 | ...... | 4.19 | 4.00 | .96 | .82 | 21.93 | 22.00<br>24.00<br>26.00 | 607<br>162<br>1054 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1052 | †Crocker's General Crop Fertilizer, ....... | Bentleyville Hdw. Co., Bentleyville, | 9.53 |
| 813 | | W. P. Rouse & Son, North East, ... | |
| 1725 | | J. L. Kulp, Indiana, ............... | |
| 2134 | Crocker's Harvest Jewel Fertilizer, ........ | Hall, Kaul & Hyde, St. Marys, ..... | 9.28 |
| 871 | †Crocker's High Grade Potato Fertilizer, | N. R. Yost, Myerstown, ............ | 6.98 |
| 807 | | L. F. Haag, Girard, ............... | |
| 1666 | | Ditz & Mooney Hdw. Co., Clarion, .. | |
| 182 | Crocker's High Grade Special, .............. | L. F. Haag, Girard, ............... | 8.75 |
| 2155 | Crocker's Nobsque Guano, .................. | O. and W. R. Davis, Kane, .......... | 3.38 |
| 1047 | †Crocker's Potato, Hop and Tobacco Fertilizer. | Bentleyville Hdw. Co., Bentleyville, | 9.05 |
| 1799 | | W. H. Ryland, Cressona, R. D., .... | |
| 160 | Crocker's Root and Vine, .................... | Linesville Coal, Lime and Cement Co., Linesville. | 10.23 |
| 606 | Crocker's Universal Grain Grower, ........ | Houck & Henry, New Berlinville, .. | 11.63 |
| 1471 | Crocker's Wheat and Corn Fertilizer, ...... | J. E. Watters, Jamestown, ......... | 9.40 |
| 1751 | †Detrick's Corn and Oats Fertilizer, ...... | Enos Barkey, Evans City, .......... | 11.23 |
| 1831 | | B. F. Horting, Newport, .......... | |
| 5 | †Detrick's Royal Crop Grower, ............ | Jas. Shoacher, Newville, ............ | 10.69 |
| 28 | | J. H. McMurray, McMurray, ....... | |
| 673 | East India Black Hawk Fertilizer, ......... | G. E. Besch, E. Smithfield, ......... | 10.20 |
| 1029 | East India Economizer Phosphate, ......... | B. J. Dougherty, Meshoppen, ....... | 9.05 |
| 1032 | East India Fruit Grower's Friend, ......... | B. J. Dougherty, Meshoppen, ....... | 5.83 |
| 1644 | †East India Hawkeye Fertilizer, ........ | Theo. Gerhart, Gilbert, ............. | 8.78 |
| 1167 | | Harrington & Wilson, Montrose, ... | |
| 1778 | | A. W. Heller, Wapwallopen, ........ | |
| 1642 | East India Improved Compound, ............ | Theo. Gerhart, Gilbert, ............. | 4.75 |
| 1031 | †East India Pilgrim Fertilizer, ............ | B. J. Dougherty, Meshoppen, ....... | 9.00 |
| 1643 | | Theo. Gerhart, Gilbert. ............. | |
| 674 | East India 10% Vegetable and Potato, .... | G. E. Beach, E. Smithfield, ........ | 8.60 |
| 1166 | East India Tiger Brand, ..................... | Harrington & Wilson, Montrose, ... | 7.78 |
| 93 | †Great Eastern General, ..................... | Wm. J. Johnson, Sinking Spring, ... | 9.15 |
| 1386 | | J. H. Pricky, Rockhill Furnace, .... | |
| 92 | †Great Eastern Northern Corn Special, .. | Wm. J. Johnson, Sinking Spring, ... | 8.48 |
| 992 | | Julius Long, Danboro, ............... | |
| 89 | †Great Eastern Vegetable Vine and Tobacco Fertilizer. | Wm. J. Johnson, Sinking Spring, ... | 8.35 |
| 1258 | | Wm. K. Goss, Dallas, ............... | |
| 119 | †Great Eastern High Grade Cabbage Grower. | William Biller, Patton, R. D. No. 1, | 9.53 |
| 91 | | Wm. J. Johnson Sinking Spring, ... | |
| 993 | | Julius Long, Danboro, ............... | |
| 1341 | Lazaretto Special Ammoniated Compound, . | D. F. Breneman, Springvale, ........ | 9.98 |
| 1826 | Maryland O. K. Ammoniated Fertilizer, ... | Paxton Flour and Feed Co., Bowmansdale. | 8.53 |
| 1866 | Maryland Special Compound for Potatoes and Tobacco. | Paxton Flour and Feed Co., Bowmansdale. | 6.40 |
| 552 | †Michigan Carbon Works General Crop Fertilizer. | Elmer H. Carl, Coopersburg, ........ | 9.33 |
| 827 | | Davis & Hide, Spartansburg, ....... | |
| 756 | †Milsom's Buffalo Guano, ................. | Keil Hdw. Co., Sharpsburg, ......... | 9.83 |
| 136 | | Jas. Jacobs, York Springs, .......... | |
| 1654 | | McCauley, McKay & Co., Brockwayville. | |
| 1793 | Milsom's Corn Fertilizer, .................... | D. R. Stein, Orwigsburg, ........... | 6.75 |
| 1728 | Milsom's Crown Phosphate, .................. | Leechburg Hdw. Co., Leechburg, ... | 8.33 |
| 1407 | Milsom's Imperial Phosphate, ............... | Grange, A. F. Beck, Sec'y, Hornstown. | 12.65 |
| 2241 | Milsom's Potato and Truck Grower, ........ | R. C. Sharp, Pittsburgh, ............ | 8.25 |
| 1744 | †Milsom's Wheat, Oats and Barley, ...... | Imbrie Bros., Petrolia, .............. | 9.10 |
| 595 | | Morris Reeser, West Leesport, ...... | |
| 1792 | | D. R. Stein, Orwigsburg, ............ | |
| 979 | Moro-Phillips C. and G. Complete Fertilizer. | Jas. W. Butz, Palm, ................ | 10.45 |
| 1788 | †Moro-Phillips Farmer's Potato Mixture, | S. G. Smith, Orwigsburg, .......... | 8.08 |
| 1882 | | E. Kinsloe, Newton Hamilton, ..... | |
| 2243 | Moro-Phillips Special Compound, ........... | Ira Doan, Richboro, .................. | 10.80 |
| 1820 | Moro-Phillips Standard Guano, ............ | W. M. Woods, Huntsdale, .......... | 9.78 |
| 1253 | †Moro-Phillips 10% Potato and Vegetable Manure. | E. S. Zehner, Tamaqua, ............ | 7.50 |
| 1113 | | Eli F. Hornberger, Ephrata, R. D. 3, | |
| 1819 | | W. M. Woods, Huntsdale, .......... | |
| 872 | †North Western Diamond Potash Mixture, | N. R. Yost, Myerstown, ............ | 8.48 |
| 466 | | Jno. Kunkle, Bath, .................. | |
| 1458 | | C. D. Duffee, Oil City, ............. | |
| 1637 | North Western Farmer's Standard, ........ | Chas. Kern, Little Gap, ............. | 6.00 |
| 994 | North Western Garden Manure, ............ | L. E. Wilcox, Danboro, .............. | 5.63 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.62 | 7.00 | 1.28 | 9.90 | 8.00 | 3.87 | ...... | 3.87 | 1.00 | .84 | .82 | 21.60 | 22.00<br>18.50<br>19.00 | 1052<br>818<br>1725 |
| 7.82 | 8.00 | 1.95 | 9.77 | 9.00 | 2.34 | ...... | 2.34 | 2.00 | 1.69 | 1.65 | 23.44 | 26.00 | 2134 |
| 6.45 | 6.00 | 1.50 | 7.95 | 7.00 | 8.00 | 1.65 | •9.65 | 10.00 | •2.93 | 3.29 | 39.94 | 32.00<br>38.50<br>40.00 | 871<br>807<br>1666 |
| 7.93 | 8.00 | 1.44 | 9.37 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | 1.79 | 1.65 | 26.08 | 28.00 | 182 |
| 7.93 | 8.00 | 1.59 | 9.52 | 9.00 | 2.04 | ...... | 2.04 | 2.00 | 1.05 | 1.03 | 20.13 | 27.00 | 2155 |
| 8.36 | 8.00 | 1.62 | 9.98 | 9.00 | 3.36 | ...... | 3.36 | 3.00 | •1.74 | 2.06 | 25.1 | 28.00<br>25.00 | 1047<br>1799 |
| 9.05 | 9.00 | 1.36 | 10.41 | 10.00 | 7.53 | ...... | 7.53 | 7.00 | .84 | .82 | 25.86 | 27.00 | 160 |
| 8.74 | 8.00 | 1.57 | 10.31 | 9.00 | 2.33 | ...... | 2.33 | 2.00 | .86 | .82 | 20.35 | 20.00 | 606 |
| •7.04 | 8.00 | 1.99 | 9.63 | 9.00 | 2.58 | ...... | 2.58 | 1.50 | 2.12 | 2.06 | 25.39 | 23.50 | 1471 |
| 9.05 | 9.00 | 1.53 | 10.58 | 10.00 | 3.44 | ...... | 3.44 | 3.00 | .85 | .82 | 21.76 | 13.06<br>17.75 | 1751<br>1831 |
| 8.45 | 8.00 | 1.72 | 10.17 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | 1.60 | 1.65 | 23.78 | 19.35<br>25.00 | 5<br>28 |
| •8.21 | 9.00 | 3.10 | 11.31 | 10.00 | 2.75 | ...... | 2.75 | 2.00 | 2.91 | 2.47 | 30.28 | 28.00 | 673 |
| 8.05 | 8.00 | 2.19 | 10.24 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | 1.15 | .82 | 21.56 | 20.00 | 1029 |
| 9.30 | 9.00 | 2.06 | 11.36 | 10.00 | 4.40 | 2.89 | 7.29 | 7.00 | .79 | .82 | 26.54 | 26.00 | 1032 |
| 6.90 | 7.00 | 2.41 | 9.31 | 8.00 | 1.62 | ...... | 1.62 | 1.00 | 1.21 | .82 | 19.70 | 18.00<br>22.00<br>18.00 | 1644<br>1167<br>1778 |
| 5.51 | 5.00 | .71 | 6.22 | 6.00 | 11.53 | ...... | 11.53 | 10.00 | 1.60 | 1.65 | 29.43 | 28.00 | 1642 |
| 7.84 | 8.00 | 1.69 | 9.53 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | .99 | .82 | 22.47 | 22.00<br>28.00 | 1031<br>1643 |
| 8.06 | 8.00 | 2.17 | 10.23 | 9.00 | 9.20 | 2.16 | 11.36 | 10.00 | 1.59 | 1.65 | 33.09 | 30.00 | 674 |
| 6.24 | 6.00 | 1.95 | 8.19 | 7.00 | 6.80 | ...... | 6.80 | 5.00 | 1.18 | 1.23 | 24.12 | 26.00 | 1166 |
| 8.85 | 8.00 | 1.12 | 9.97 | 9.00 | 4.46 | ...... | 4.46 | 4.00 | .88 | .82 | 22.59 | 20.00<br>21.00 | 93<br>1386 |
| 9.80 | 9.00 | 1.10 | 10.90 | 10.00 | 2.70 | ...... | 2.70 | 2.00 | 2.69 | 2.47 | 30.00 | 25.50<br>24.50 | 92<br>992 |
| 8.51 | 8.00 | 1.43 | 9.94 | 9.00 | 3.67 | ...... | 3.67 | 3.00 | 2.22 | 2.06 | 27.52 | 24.00<br>25.00 | 189<br>1258 |
| 9.49 | 9.00 | 1.02 | 10.51 | 10.00 | 6.83 | ...... | 6.83 | 7.00 | .83 | .82 | 25.44 | 23.00<br>23.00<br>22.50 | 119<br>91<br>993 |
| 9.33 | 9.00 | 1.70 | 11.03 | 10.00 | 2.83 | ...... | 2.83 | 3.00 | •.80 | 1.03 | 21.31 | 19.00 | 1341 |
| 8.21 | 8.00 | 1.24 | 9.45 | 9.00 | 2.87 | ...... | 2.87 | 2.00 | .84 | .82 | 20.14 | 18.00 | 1826 |
| 8.50 | 8.00 | 1.19 | 9.69 | 9.00 | 9.55 | ...... | •9.55 | 10.00 | 1.55 | 1.65 | 30.46 | 28.00 | 1866 |
| 8.19 | 8.00 | 1.21 | 9.40 | 9.00 | 4.35 | ...... | 4.35 | 4.00 | .73 | .82 | 21.43 | 21.00<br>22.00 | 552<br>827 |
| 8.69 | 8.00 | 1.57 | 10.26 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | .86 | .82 | 22.59 | 25.00<br>21.30<br>22.00 | 756<br>136<br>1654 |
| 9.71 | 9.00 | 1.17 | 10.88 | 10.00 | 2.87 | ...... | 2.87 | 2.00 | 2.54 | 2.47 | 29.41 | 27.00 | 1793 |
| 9.85 | 10.00 | 1.00 | 10.85 | 11.00 | 2.65 | ...... | 2.65 | 2.00 | .46 | ...... | 16.60 | 20.00 | 1728 |
| •11.51 | 12.00 | .88 | •12.39 | 13.00 | 4.43 | ...... | •4.43 | 5.00 | .45 | ...... | 18.50 | ..... | 1407 |
| 7.77 | 8.00 | 2.08 | 9.85 | 9.00 | 10.33 | ...... | 10.33 | 10.00 | 1.65 | 1.65 | 31.40 | 30.00 | 2241 |
| 8.41 | 8.00 | 1.83 | 10.24 | 9.00 | 2.33 | ...... | 2.33 | 2.00 | 1.00 | .82 | 20.82 | 26.00<br>21.00<br>19.00 | 1744<br>595<br>1792 |
| 8.14 | 8.00 | 1.77 | 9.91 | 9.00 | 2.12 | ...... | 2.12 | 2.00 | .86 | .82 | 19.58 | 19.00 | 979 |
| 6.82 | 6.00 | 1.19 | 8.01 | 7.00 | 5.36 | ...... | 5.36 | 5.00 | 1.46 | 1.23 | 23.98 | 26.00<br>25.00 | 1788<br>1882 |
| 8.48 | 8.00 | .75 | 9.23 | 9.00 | 2.96 | ...... | •2.96 | 6.00 | •1.07 | 2.06 | 21.24 | 30.00 | 2243 |
| 8.49 | 8.00 | 1.30 | 9.79 | 9.00 | 4.45 | ...... | 4.45 | 4.00 | .94 | .82 | 22.57 | 18.50 | 1820 |
| 8.64 | 8.00 | 1.12 | 9.76 | 9.00 | 10.02 | ...... | 10.02 | 10.00 | 1.62 | 1.65 | 31.24 | 28.00<br>26.50<br>27.00 | 1253<br>1113<br>1819 |
| 7.85 | 8.00 | 1.60 | 9.45 | 9.00 | 2.00 | 8.87 | 10.87 | 10.00 | 1.66 | 1.65 | 33.88 | 27.00<br>28.50<br>29.50 | 872<br>466<br>1458 |
| 6.18 | 6.00 | 1.66 | 7.84 | 7.00 | 5.88 | ...... | 5.88 | 5.00 | 1.23 | 1.23 | 23.19 | ..... | 1637 |
| 8.51 | 8.00 | 1.21 | 9.72 | 9.00 | 7.06 | .16 | 7.22 | 7.00 | •2.94 | 3.29 | 34.48 | 36.00 | 994 |

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•Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1812 | North Western Earth Warmer Phosphate, .. | Berger Bros., Pine Grove, .......... | 3.65 |
| 1813 | North Western Puritan Phosphate, ......... | Berger Bros., Pine Grove, .......... | 5.65 |
| 1610 | North Western Shawnee Phosphate, ....... | H. F. Rittenhouse, Berwick, ....... | 3.28 |
| 667 | †Packer's Union Animal Corn Fertilizer, | C. Gerauld, Milan, ..................... | 12.06 |
| 120 | | Wm. Biller, Patton, R. D. 1, ...... | |
| 1776 | | Sam Smith, Nescopeck, .............. | |
| 118 | †Packer's Union Potato Manure, .......... | Wm. Biller, Patton, R. D. 1, ....... | 10.55 |
| 1968 | | S. A. Detrick, Milford, .............. | |
| 239 | †Packer's Union Universal Fertilizer, .... | Solomon Peck, Nittany, R. D. 1, .. | 6.45 |
| 122 | | Wm. Biller, Patton, R. D. 1, ....... | |
| 666 | | C. Gerauld, Milan, ................... | |
| 551 | Quinnipiac Mohawk Fertilizer, ............. | Elmer H. Carl, Coopersburg, ......... | 7.48 |
| 1786 | Read's Leader Fertilizer, ..................... | S. G. Smith, Orwigsburg, .......... | 7.93 |
| 470 | Read's Potash Compound, .................. | Irwin H. Fisher, Nazareth, ......... | 7.48 |
| 1856 | Reese's Ammoniated Phosphate Mixture, .. | L. C. Martin, Laysville, ............. | 9.78 |
| 991 | Reese's Half and Half, ....................... | Benj. Hall, Danboro, ................. | 9.43 |
| 853 | †Reese's Pilgrim Fertilizer, .............. | A. G. Houtz, Myerstown, ............ | 8.53 |
| 1328 | | Milton Newman, Dover, ............. | |
| 840 | Reese's Potato Manure, ...................... | J. B. Curry Estate, Swatara, ....... | 9.33 |
| 801 | †Sharpless & Carpenter's Gilt Edge Potato and Tobacco Manure. | H. L. Linden, Milton, ............ | 8.15 |
| 529 | | L. F. Mosser, Mosserville, ........... | |
| 999 | | M. A. Kirby, Falsington, .......... | |
| 75 | Sharpless & Carpenter's No. 2 for Grain and Grass. | L. A. Geiger, Joanna, ................ | 9.06 |
| 998 | †Sharpless & Carpenter's Potato, Corn and Truck Guano. | M. A. Kirby, Falsington, ............ | 8.28 |
| 530 | | L. F. Mosser, Mosserville, ........... | |
| 1155 | | Smith & McKelvey, Blairsville, .... | |
| 1219 | †Susquehanna Crop Grower, ............. | S. P. Klingle, Middleburg, .......... | 9.33 |
| 266 | | Z. J. Peters, Gernsey, ............... | |
| 1295 | | Percy Harman, Mt. Holly Springs,.. | |
| 241 | †Susquehanna Potato Phosphate, ......... | The J. N. Getz Co., Lock Haven, .. | 11.15 |
| 135 | | James Jacobs, York Springs, ....... | |
| 439 | | Jas. Robinson, Honeybrook, ......... | |
| 438 | †Susquehanna Ammoniated Phosphate, ... | James Robinson, Honeybrook, ...... | 6.73 |
| 95 | | Amos K. Stoltzfus, Elverson, ........ | |
| 691 | | Henry Sunday, East Berlin, ......... | |
| 1 | Susquehanna High Grade Truck Mixture,.. | Paxton Flour and Feed Co., Bowmansdale. | 6.77 |
| 242 | †Susquehanna Special Potato and Tobacco Manure. | J. N. Getz & Co., Lock Haven, ...... | 7.06 |
| 94 | | Amos K. Stoltzfus, Elverson,......... | |
| 440 | | James Robinson, Honeybrook, ...... | |
| 12 | Tygert Allen Ten Per Cent. Potato and Vegetable Manure. | J. M. Darrah, Hartsville, ........... | 9.46 |
| 1869 | Tygert Allen's Standard Brand Phosphate, | Paxton Flour and Feed Co., Bowmansdale. | 8.23 |
| 1936 | Tygert Allen's Star Brand Phosphate, .... | Harvey Detwiler, Chester Springs, .. | 7.33 |
| 1937 | Tygert Allen's Star Potato Grower, ...... | Harvey Detwiler, Chester Springs, .. | 8.35 |
| 277 | †Wheeler's Corn Fertilizer, ............... | Daniel Slagen, Logan Mills, ........ | 9.60 |
| 1396 | | S. A. Norris, Shirleysburg, .......... | |
| 88 | †Wheeler's Special Vegetable Manure, ... | Wm. J. Johnston, Sinking Spring, .. | 8.15 |
| 1775 | | Sam Smith, Nescopeck, ............... | |
| 895 | Williams' & Clark's Americus Fertilizer, .. | Simon Carl, Numidia, ................ | 6.80 |
| 1486 | Williams' & Clark's Chesterfield Manure,.. | J. D. Morris, Covington, ............ | 8.08 |
| 894 | †Williams' & Clark's Elk Brand, .......... | Simon Carl, Numidia, ................ | 7.73 |
| 1980 | | Stewart Weaver, Easton, ........... | |
| 996 | †Williams' & Clark's Good Grower, ...... | Jacob Rush, Plumsteadville, ........ | 6.43 |
| 896 | | Simon Carl, Numidia, ................ | |
| 1641 | | Milton A. Smith, Aquashsashicole, | |
| 997 | Williams' & Clark's Matchless Fertilizer,.. | Jacob Rush, Plumsteadville, ........ | 10.08 |
| 483 | Williams' & Clark's Panther Phosphate, .. | N. F. Walker, Athens, .............. | 4.80 |
| 1544 | Williams' & Clark's Prolific Fertilizer, | C. R. Rosenberger, Colmar, ........ | 9.35 |
| 484 | | N. F. Walker, Athens, .............. | |
| 1640 | | Milton A. Smith, Aquashsashicole, | |
| 490 | †Williams' & Clark's Royal Phosphate, .. | C. E. Drake, Athens, ................ | 10.40 |
| 243 | | H. L. Lindner, Milton, .............. | |
| 1545 | | C. K. Rosenberger, Colmar, ........ | |
| 1487 | Williams' & Clark's Springfall Phosphate, | J. D. Morris, Covington, ............ | 10.70 |
| 519 | †Zell's Economizer Phosphate, ........... | C. H. Kistler, Slatington, ........... | 11.06 |
| 259 | | O. F. Arnold, Dillsburg, ............. | |
| 658 | | Tressler, Schlegle & Co., Red Cross, | |
| 749 | Zell's Hustler Phosphate, .................. | Chas. T. Wills & Co., Parnassus, ... | 7.08 |
| 258 | †Zell's Special Compound for Potatoes and Vegetables. | O. F. Arnold, Dillsburg, ............ | 8.70 |
| 520 | | C. H. Kistler, Slatington, R. D. 2, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.51 | 6.00 | 1.18 | 7.69 | 7.00 | 10.66 | ...... | 10.66 | 10.00 | 2.42 | 2.47 | 33.44 | 30.00 | 1812 |
| 9.23 | 9.00 | .98 | 10.21 | 10.00 | 7.64 | ...... | 7.64 | 7.00 | .82 | .82 | 25.71 | 24.00 | 1813 |
| 8.26 | 8.00 | 1.64 | 9.90 | 9.00 | 4.50 | ...... | 4.50 | 4.00 | 1.65 | 1.65 | 25.72 | 22.00 | 1610 |
| 9.68 | 9.00 | 1.47 | 11.15 | 10.00 | 2.56 | ...... | 2.56 | 2.00 | 2.52 | 2.47 | 29.00 | 26.00<br>25.00<br>..... | 667<br>120<br>1776 |
| 8.07 | 8.00 | 2.14 | 10.21 | 9.00 | 5.73 | .62 | 6.35 | 6.00 | 2.27 | 2.06 | 30.52 | 27.00<br>32.00 | 118<br>1968 |
| 8.42 | 8.00 | 1.89 | 10.31 | 9.00 | 4.04 | ...... | 4.04 | 4.00 | .81 | .82 | 21.66 | 21.00<br>20.00<br>21.60 | 239<br>122<br>666 |
| 7.72 | 7.00 | 1.45 | 9.17 | 8.00 | 1.18 | ...... | 1.18 | 1.00 | .80 | .82 | 17.83 | 18.00 | 551 |
| 9.04 | 7.00 | 1.41 | 10.45 | 8.00 | 1.32 | ...... | 1.32 | 1.00 | .94 | .82 | 19.96 | 20.00 | 1786 |
| 8.43 | 8.00 | 1.82 | 10.25 | 9.00 | 10.40 | ...... | 10.40 | 10.00 | *1.45 | 1.65 | 31.10 | 27.00 | 470 |
| 9.46 | 9.00 | 1.34 | 10.80 | 10.00 | 3.16 | ...... | 3.16 | 3.00 | *.72 | .82 | 21.09 | 20.00 | 1856 |
| 7.67 | 7.00 | 1.02 | 8.69 | 8.00 | .97 | ...... | .97 | 1.00 | .90 | .82 | 17.82 | 18.00 | 991 |
| 8.21 | 8.00 | 1.31 | 9.52 | 9.00 | 4.33 | ...... | 4.33 | 4.00 | .82 | .82 | 21.48 | 21.00<br>20.10 | 853<br>1328 |
| 10.39 | 9.00 | .96 | 11.35 | 10.00 | 7.94 | ...... | 7.94 | 7.00 | 1.06 | .82 | 28.36 | 21.00 | 840 |
| 8.33 | 8.00 | 1.12 | 9.45 | 9.00 | 7.33 | 2.57 | 9.90 | 10.00 | 1.62 | 1.65 | 31.46 | .....<br>28.00<br>32.00 | 801<br>529<br>999 |
| 7.77 | 7.00 | 1.11 | 8.88 | 8.00 | 1.32 | ...... | 1.32 | 1.00 | .91 | .82 | 18.27 | 17.00 | 75 |
| 6.80 | 6.00 | 1.31 | 8.11 | 7.00 | 5.38 | ...... | 5.38 | 5.00 | 1.26 | 1.23 | 23.17 | 26.00<br>22.00<br>28.00 | 998<br>530<br>1155 |
| 7.41 | 7.00 | 1.28 | 8.69 | 8.00 | 1.59 | ...... | 1.59 | 1.00 | 1.01 | .82 | 18.76 | .....<br>18.00<br>17.00 | 1219<br>266<br>1295 |
| 8.35 | 8.00 | 1.40 | 9.75 | 9.00 | 5.50 | ...... | 5.50 | 5.00 | 1.48 | 1.65 | 26.10 | 27.00<br>25.40<br>25.00 | 241<br>135<br>439 |
| 8.57 | 8.00 | 1.36 | 9.93 | 9.00 | 2.76 | ...... | 2.76 | 2.00 | *1.45 | 1.65 | 23.24 | 24.00<br>20.95<br>21.00 | 488<br>95<br>691 |
| 7.07 | 6.00 | 1.62 | 8.69 | 7.00 | 8.66 | 1.72 | 10.38 | 10.00 | *2.53 | 3.29 | 35.09 | 35.00 | 1 |
| *7.51 | 8.00 | 1.33 | 8.84 | 9.00 | 10.58 | ...... | 10.58 | 10.00 | 1.56 | 1.65 | 30.58 | 33.00<br>27.45<br>30.00 | 242<br>94<br>440 |
| 8.98 | 8.00 | .99 | 9.97 | 9.00 | 8.84 | ...... | *8.84 | 10.00 | 1.47 | 1.65 | 29.67 | 31.00 | 52 |
| 8.04 | 8.00 | 1.50 | 9.54 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.46 | 1.65 | 22.23 | 22.00 | 1869 |
| 8.14 | 8.00 | 1.67 | 9.81 | 9.00 | 3.77 | ...... | 3.77 | 3.00 | 2.04 | 2.06 | 26.68 | 26.00 | 1936 |
| 6.32 | 6.00 | 1.76 | 8.08 | 7.00 | 5.47 | ...... | 5.47 | 5 00 | 1.17 | 1.23 | 23.02 | 24.00 | 1937 |
| 7.95 | 8.00 | 1.44 | 9.39 | 9.00 | 2.43 | ...... | 2.43 | 2.00 | 1.54 | 1.65 | 22.77 | 23.00 | 237 |
| 8.77 | 8.00 | 1.11 | 9.88 | 9.00 | 9.50 | ...... | *9.50 | 10.00 | 1.66 | 1.65 | 31.12 | .....<br>28.00<br>..... | 1396<br>88<br>1775 |
| *7.59 | 8.00 | 1.99 | 9.58 | 9.00 | 10.87 | ...... | 10.87 | 10.00 | 1.56 | 1.65 | 31.24 | 26.00 | 895 |
| 6.64 | 6.00 | 1.78 | 8.42 | 7.00 | 5.53 | ...... | 5.53 | 5.00 | 2.61 | 2.47 | 29.52 | 28.00 | 1486 |
| 8.90 | 8.00 | 1.67 | 10.57 | 9.00 | 4.72 | ...... | 4.72 | 4.00 | 1.01 | .82 | 23.64 | 19.00<br>30.00 | 894<br>1980 |
| 7.30 | 6.00 | 1.53 | 8.83 | 7.00 | 4.35 | ...... | *4.35 | 5.00 | 1.28 | 1.23 | 22.96 | 21.60<br>22.00<br>17.30 | 996<br>896<br>1641 |
| 9.03 | 8.00 | 1.32 | 10.35 | 9.00 | 2.41 | ...... | 2.41 | 2.00 | 1 56 | 1.65 | 23.77 | 21.75 | 997 |
| 5.65 | 5.00 | .75 | 6.40 | 6.00 | 11.62 | ...... | 11.62 | 10.00 | 1.67 | 1.65 | 29.88 | 28.00 | 483 |
| 8.55 | 7.00 | 1.21 | 9.76 | 8.00 | 1.56 | ...... | 1.56 | 1.00 | 1.06 | .82 | 20.07 | 24.00<br>20.00<br>17.00 | 1544<br>484<br>1640 |
| 8.20 | 8.00 | 1.85 | 10.05 | 9.00 | 2.52 | ...... | 2.52 | 2.00 | 1.15 | 1.03 | 21.45 | 21.06<br>18.00<br>28.00 | 490<br>243<br>1545 |
| 8.17 | 8.00 | 2.56 | 10.73 | 9.00 | 3.31 | ...... | 3.31 | 3.00 | 2.20 | 2.06 | 27.39 | 25.00 | 1487 |
| 8.64 | 8.00 | 1.29 | 9.93 | 9.00 | 2.21 | ...... | 2.21 | 2.00 | .98 | .82 | 20.65 | .....<br>17.75<br>18.50 | 519<br>259<br>658 |
| *8.73 | 9.00 | 1.95 | 10.68 | 10.00 | 3.30 | ...... | 3 30 | 3.00 | .94 | .82 | 21.97 | 26.00 | 749 |
| 8.20 | 8.00 | 1.87 | 10.07 | 9.00 | 4.66 | ...... | 4.66 | 4.00 | 2.64 | 2.47 | 30.48 | 26.50<br>..... | 258<br>520 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **AMERICAN FERTILIZING CO., BALTIMORE, MD.** | | |
| 1931 | American Champion Grain Grower, | Geo. R. Watson, Embreeville, | 11.88 |
| 752 | American Eagle Crop Grower, | Chas. T. Wills & Co., Parnassus, | 8.03 |
| 751 | American Reliable Guano, | Chas. T. Wills & Co., Parnassus, | 7.78 |
| 1558 | †American Special Compound Guano, | Jones Eavenson, Christiana, | 10.38 |
| 1688 | | J. D. Coldsmith, Williamson, | |
| | **ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD.** | | |
| 878 | Complete Potato, | M. L. Bachman, Lebanon, | 9.23 |
| 443 | †Wheat, Corn and Oat Special, | Reese H. White, Honeybrook, | 5.88 |
| 355 | | Confluence Lumber Yard, Confluence, | |
| 509 | | Heffner & Luckenbill, Friedensburg, | |
| 611 | †Crop Grower, | D. N. Zeller, Meyerstown, R. D. 5, | 7.65 |
| 568 | | Seligman & Co., Tamaqua, | |
| 724 | | C. A. Boyer, Roaring Springs, | |
| 1235 | Farmer's Choice, | J. M. Zook, Belleville, | 6.50 |
| 430 | †High Grade Potato, | Winabarn Grange, Nichols, N. Y., | 6.18 |
| 804 | | F. G. Kintzel, Richland, | |
| 442 | †Grain Grower, | Reese H. White, Honeybrook, | 8.98 |
| 357 | | Confluence Lumber Co., Confluence, | |
| 586 | | Chas. Yaeckle, Patton, | |
| 1087 | Lancaster County Tobacco Special, | Sam. H. Snavely, Manheim, | 4.95 |
| 1936 | Pennsylvania Tobacco Grower, | Sam. H. Snavely, Manheim, | 6.53 |
| 1938 | Pennsylvania Tobacco Special, | Sam. H. Snavely, Manheim, | 4.83 |
| 444 | †Royal Ammoniated, | Reese H. White, Honeybrook, | 7.50 |
| 398 | | A. L. Ickes, Osterburg, | |
| 508 | | Heffner & Luckenbill, Friedensburg, | |
| 947 | †Superior, | H. C. Beerits & Sons, Somerset, | 6.98 |
| 759 | | Henry S. Brown, Cocolamus, | |
| 1144 | | A. Skelly, Ebensburg, | |
| 1202 | †Superphosphate, Bone, Blood and Potash, | M. L. Bachman, Lebanon, | 10.28 |
| 746 | | Chas. T. Wills & Co., Parnassus, | |
| 1285 | | Nickles & Stewart, Shippensburg, | |
| 782 | †Wheat and Grass Special, | E. H. Buhle, Williamsburg, | 5.78 |
| 927 | | S. W. Fritz, Garrett, | |
| | **ATLANTIC FERTILIZER CO., BALTIMORE, MD.** | | |
| 948 | Arrow Brand Special, | Robt. Speicher, Rockwood, | 5.53 |
| 1678 | XX Special Compound for Potatoes, | S. F. Peckman, Williamson, | 5.13 |
| 1696 | Standard Compound, | Lizzele George, Tioga, | 5.10 |
| | **BALTIMORE FERTILIZER CO., BALTIMORE, MD.** | | |
| 228 | Honest Potato Grower, | H. E. Van Orner, Thompsontown, | 6.95 |
| 229 | Honest Success, | H. E. Van Orner, Thompsontown, | 5.70 |
| 625 | Honest Tankage, Rock and Potash, | I. M. Leightner, Gettysburg, | 6.38 |
| | **BAUGH & SONS COMPANY, PHILADELPHIA, PA.** | | |
| 1888 | Baugh's Wheat Fertilizer for Wheat and Grass. | Western Penitentiary, Bellefonte, | 7.83 |
| 1803 | Baugh's High Grade Potato Grower, | C. G. Updegrove, Sacramento, | 5.83 |
| 1583 | The Wrapper Leaf Brand. A Special Manure for Seed Leaf Tobacco. | J. H. Umble & Bro., Bird-in-Hand, | 5.10 |
| 987 | †Baugh,s Balanced Plant Food. A Superior Fertilizer for General Use. | Wm. P. Hay, Somerset, R. D., | 9.85 |
| 1084 | | Jas. G. Kauffman, Dauberville, | |
| 1837 | †Baugh's Animal Base and Potash Compound for All Crops. | Brillinger & Swartz, Emigsville, | 8.15 |
| 1582 | | J. H. Umble & Bro., Bird-in-Hand, | |
| 216 | †Baugh's Excelsior Guano, | Wisenhaupt & Frazer, Port Royal, | 7.88 |
| 146 | | Cook & Co., Dillsburg, | |
| 458 | | John F. Steir, Johnsonville, | |
| 1018 | †Baugh's Potato and Truck Special for all Truck Crops. | Hobensack Bros., Ivyland, | 8.06 |
| 449 | | Jno. F. Steir, Johnsonville, | |
| 1174 | | M. M. Jacklin, Wilawana, | |
| 437 | †Baugh's General Crop Grower for all Crops. | Ed. Brinton & Sons, West Chester, | 7.60 |
| 264 | | Grover C. Myers, Idaville, | |
| 459 | | Jno. F. Steir, Johnsonville, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.74 | 8.00 | 2.45 | 12.19 | 9.00 | 3.76 | ...... | •3.76 | 4.00 | .81 | .82 | 23.00 | 21.00 | 1931 |
| 8.57 | 8.00 | 2.26 | 10.83 | 9.00 | 2.26 | .15 | 2.41 | 2.00 | 1.61 | 1.65 | 24.03 | 27.00 | 752 |
| 8.93 | 8.00 | 1.16 | 10.09 | 9.00 | 1.33 | ...... | 1.33 | 1.00 | .96 | .82 | 19.80 | 25.00 | 751 |
| 7.64 | 7.00 | 2.21 | 9.85 | 8.00 | 3.36 | ...... | 3.36 | 3.00 | .64 | .41 | 19.64 | 17.00<br>16.00 | 1558<br>1688 |
| 6.23 | 6.00 | .88 | 7.11 | 6.50 | 11.29 | ...... | 11.29 | 10.00 | •3.08 | 3.29 | 36.60 | 33.00 | 878 |
| •6.57 | 7.00 | 1.41 | 7.98 | 7.50 | 1.41 | ...... | 1.41 | 1.00 | .86 | .82 | 17.06 | 17.00<br>19.00<br>18.00 | 443<br>355<br>509 |
| 8.07 | 8.00 | .73 | 8.80 | 8.50 | 2.46 | ...... | 2.46 | 2.00 | .86 | .82 | 19.34 | 19.00<br>22.00<br>18.00 | 611<br>563<br>724 |
| 9.19 | 9.00 | 1.52 | 10.71 | 9.50 | 3.59 | ...... | 3.59 | 3.00 | .81 | .82 | 21.82 | 19.50 | 1235 |
| •7.71 | 8.00 | 1.33 | 9.04 | 8.50 | 10.21 | ...... | 10.21 | 10.00 | 1.76 | 1.65 | 31.29 | 23.85<br>27.50 | 480<br>864 |
| 7.89 | 8.00 | 1.40 | 9.29 | 8.50 | 2.35 | ...... | 2.35 | 2.00 | 1.61 | 1.65 | 22.88 | 20.00<br>24.00<br>22.00 | 442<br>357<br>586 |
| 4.46 | 4.50 | 2.43 | 6.89 | 5.00 | 1.60 | 9.71 | 11.31 | 10.50 | •5.58 | 6.17 | 49.57 | 45.50 | 1987 |
| 7.82 | 8.00 | 1.24 | 9.06 | 8.50 | 5.33 | .36 | •5.69 | 6.00 | •1.80 | 2.47 | 27.07 | 28.50 | 1986 |
| 8.62 | 8.00 | 1.81 | 10.43 | 8.50 | 1.20 | 5.05 | •6.25 | 7.00 | •3.70 | 4.11 | 38.54 | 37.00 | 1988 |
| 7.82 | 8.00 | 1.52 | 9.34 | 8.50 | 4.11 | ...... | 4.11 | 4.00 | .84 | .82 | 21.19 | 19.00<br>.....<br>21.00 | 444<br>398<br>508 |
| 8.04 | 8.00 | .64 | 8.68 | 8.50 | 7.09 | ...... | 7.09 | 7.00 | .84 | .82 | 24.04 | 25.00<br>22.00<br>22.00 | 947<br>759<br>1144 |
| 8.47 | 8.00 | 1.77 | 10.24 | 8.50 | 7.01 | ...... | 7.01 | 7.00 | •3.86 | 4.11 | 38.61 | 35.00<br>42.00 | 1262<br>746 |
| 6.98 | 7.00 | .83 | 7.81 | 7.50 | 5.63 | ...... | 5.63 | 5.00 | 1.01 | .82 | 22.25 | 37.00<br>19.00<br>22.00 | 1285<br>782<br>927 |
| 7.86 | 8.00 | 1.06 | 8.92 | 9.00 | 4.39 | ...... | 4.39 | 4.00 | .99 | .82 | 21.96 | 18.50 | 948 |
| 7.87 | 8.00 | 1.25 | 9.12 | 9.00 | 11.01 | ...... | 11.01 | 10.00 | 1.58 | 1.65 | 31.52 | 27.00 | 678 |
| •7.51 | 8.00 | .92 | •8.43 | 9.00 | 2.41 | ...... | 2.41 | 2.00 | 1.70 | 1.65 | 22.74 | 27.00 | 1696 |
| 7.11 | 6.00 | 2.55 | 9.66 | 7.00 | 9.54 | ...... | 9.54 | 8.00 | 1.55 | 1.60 | 29.68 | 26.00 | 228 |
| 7.16 | 7.00 | 1.93 | 9.09 | 8.00 | 4.68 | ...... | 4.68 | 4.00 | .90 | .80 | 21.54 | 19.00 | 229 |
| 7.89 | 7.00 | .51 | 8.40 | 8.00 | 1.92 | ...... | 1.92 | 1.00 | .78 | .20 | 18.30 | 16.00 | 625 |
| 7.98 | 8.00 | 1.38 | 9.36 | ...... | 2.97 | ...... | 2.97 | 2.00 | 1.61 | 1.65 | 23.49 | ..... | 1888 |
| 9.10 | 8.00 | 1.95 | 11.05 | ...... | 9.60 | .73 | 10.33 | 10.00 | 3.63 | 3.30 | 42.01 | 32.50 | 1803 |
| 4.65 | 3.50 | 1.85 | 6.50 | ...... | 6.37 | ...... | 6.37 | 5.00 | 3.35 | 3.30 | 31.78 | 28.00 | 1583 |
| 11.67 | 10.50 | 1.34 | 13.01 | ...... | 5.64 | ...... | •5.64 | 7.00 | 1.70 | 1.65 | 30.44 | 28.00<br>26.00 | 937<br>1084 |
| 8.70 | 8.00 | 2.07 | 10.77 | ...... | 2.95 | ...... | 2.95 | 2.00 | 1.58 | 1.65 | 24.57 | 21.00<br>22.00 | 1337<br>1582 |
| 8.69 | 8.00 | 1.19 | 9.88 | ...... | 4.39 | ...... | 4.39 | 4.00 | 1.01 | .82 | 22.90 | 19.65<br>18.25<br>25.00 | 216<br>146<br>458 |
| 8.28 | 7.00 | 1.28 | 9.56 | ...... | 7.08 | ...... | 7.08 | 7.00 | 2.89 | 2.88 | 33.94 | 34.10<br>35.00<br>32.10 | 1018<br>449<br>1174 |
| 8.94 | 8.00 | 2.42 | 11.36 | ...... | 1.86 | ...... | 1.86 | 1.00 | 1.08 | .82 | 21.58 | 21.00<br>16.50<br>..... | 437<br>264<br>459 |

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•Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1016 | †Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables. | Hobensack Bros., Ivyland, ......... | 6.25 |
| 550 | | S. K. Moore, Coopersburg, .......... | |
| 1175 | | M. M. Jacklin, Wilawana, ......... | |
| 1898 | †Baugh's Peninsula Grain Producer, .... | A. M. Rishel, Bellefonte, .......... | 8.80 |
| 148 | | Cook & Co., Dillsburg, ............ | |
| 1958 | | Olive Miheil, Bushkill, ........... | |
| 224 | †Baugh's Grand Rapids High Grade Guano. | John D. Miller, Richfield, ........... | 5.88 |
| 1358 | | C. I. Saylor, Felton, ............... | |
| 262 | †Baugh's Ammoniated Soluble Alkaline, | Grover C. Meyers, Idaville, ........ | 7.53 |
| 79 | | L. A. Geiger, Joanna, ............. | |
| 1279 | | S. E. Shank, Newville, ............ | |
| 147 | †Baugh's Complete Animal Base Fertilizer. | Cook & Co., Dillsburg, ............ | 7.83 |
| 76 | | L. A. Geiger, Joanna, ............. | |
| 198 | | Frank Sieber, Mifflintown, .......... | |
| 263 | †Baugh's Special Potato Manure, ........ | Grover C. Meyers, Idaville, ......... | 6.25 |
| 77 | | L. A. Geiger, Joanna, ............. | |
| 435 | | Ed. Brinton & Sons, W. Chester, ... | |
| | W. C. BECKERT, NORTH SIDE, PITTSBURGH, PA. | | |
| 324 | Beckert's Odorless Lawn and Garden Fertilizer. | W. C. Beckert, Pittsburgh, ......... | 6.00 |
| | THE BERG COMPANY, PHILADELPHIA, PA. | | |
| 1997 | D. K. Dee Kay Guano, ..................... | W. C. Herr, Strasburg, ............ | 4.73 |
| 407 | †Berg's High Grade Potato Manure, ...... | B. R. Watson, Oxford, ............ | 7.65 |
| 1247 | | Wm. T. Zeigler, Cressona, .......... | |
| 984 | †Berg's Ya Goot Brand, .................. | Jas. Brady, Lansdale, ............. | 8.73 |
| 1117 | | A. B. Graff, New Holland, ......... | |
| 1933 | Berg's Pure Dissolved Bone and Potash for Wheat and Grass. | Geo. R. Watson, Embreeville, ...... | 4.38 |
| 406 | †Berg's S. B. M. Standard Bone Manure, | B. R. Watson, Oxford, ............ | 8.73 |
| 1248 | | Wm. T. Zeigler, Cressona, .......... | |
| 409 | †Berg's Special Bone Manure, ............ | B. R. Watson, Oxford, ............ | 7.58 |
| 1550 | | A. B. Graff, New Holland, ......... | |
| 1984 | Berg's Tobacco Manure, .................. | A. B. Graff, New Holland, ......... | 9.93 |
| | BERGER BROS., EASTON, PA. | | |
| 1626 | Farmers' Favorite Superphosphate, ......... | John Osterstock, Easton, ........... | 16.13 |
| | D. BLOCKER & CO., BALTIMORE, MD. | | |
| 628 | Ammoniated Soluble Phosphate, ........... | J. H. Stevens' Barn, Gettysburg, .. | 8.00 |
| | J. W. BARWELL, WAUKEGAN, ILL. | | |
| 739 | Barwell's Plant Grower and Land Renovater. | H. J. Klinger & Co., Butler, ....... | 7.50 |
| | BOWKER FERTILIZER CO., NEW YORK CITY. | | |
| 318 | †Bowker's Corn and Grain Grower, .... | C. S. Hunter & Co., Washington, .. | 10.30 |
| 205 | | Jno. Sieber, Mifflintown, ........... | |
| 344 | | L. S. Harris, Harrisburg, .......... | |
| 748 | Bowker's Farm and Garden Phosphate, .... | Chas. T. Willis & Co., Parnassus, .. | 8.68 |
| 1376 | Bowker's Ideal Potash Compound, ........ | H. W. Rehmeyer, Turnpike, ....... | 10.45 |
| 345 | †Bowker's Market Garden Fertilizer, .... | L. S. Harris, Harrisburg, .......... | 13.13 |
| 316 | | C. S. Hunter Co., Washington, ..... | |
| 1104 | | Wm. Gerhart, Reinholds, ........... | |
| 348 | †Bowker's Potash Fertilizer, .............. | S. A. Fishburn, Penbrook, .......... | 8.38 |
| 1402 | | B. F. Fink, Huntingdon, .......... | |
| 452 | †Bowker's Potash or Staple Phosphate, .. | Isaac Snyder, Bangor, ............. | 9.85 |
| 670 | | Walter Pierce, E. Smithfield, ....... | |
| 750 | †Bowker's Potato and Vegetable Fertilizer. | Chas. T. Wills & Co., Parnassus, ... | 10.06 |
| 727 | | H. L. Stultz, Hollidaysburg, ....... | |
| 1403 | | B. F. Fink, Huntingdon, .......... | |
| 1740 | †Stockbridge's Special Complete Manure for Potatoes and Vegetables. | Alex Strittmatter, Bradley's Junc., | 7.38 |
| 1261 | | H. B. Harned, Wyoming, .......... | |
| 1911 | | J. C. Mattern, Port Matilda, ....... | |
| 1912 | Stockbridge's Special Complete Manure for Corn and All Grain Crops. | J. C. Mattern, Port Matilda, ....... | 1.23 |
| 451 | †Bowker's Special Crop Grower, ......... | Isaac Snyder, Bangor, ............. | 7.45 |
| 1378 | | H. W. Rehmeyer, Turnpike, ....... | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.94 | 6.00 | 1.45 | 8.39 | ...... | 5.86 | 1.81 | 7.67 | 7.00 | 4.10 | 4.1 | 39.12 | 38.00<br>35.00<br>35.60 | 1016<br>550<br>1175 |
| 8.95 | 8.00 | 1.66 | 10.61 | ...... | 3.32 | ...... | 3.32 | 2.00 | .98 | 1.00 | 22.26 | .....<br>18.25<br>22.00 | 1898<br>148<br>1950 |
| 8.35 | 8.00 | 1.00 | 9.35 | ...... | 3.51 | ...... | 3.51 | 3.00 | 2.43 | 2.47 | 28.15 | 25.50<br>24.00 | 224<br>1358 |
| 8.33 | 8.00 | 1.19 | 9.52 | ...... | 2.48 | ...... | 2.48 | 2.00 | .41 | .41 | 15.22 | 15.00<br>17.00<br>15.00 | 262<br>79<br>1279 |
| 8.76 | 8.00 | 2.05 | 10.81 | ...... | 4.81 | ...... | 4.81* | 5.00 | 1.50 | 1.65 | 26.05 | 22.75<br>23.00<br>..... | 147<br>76<br>198 |
| 5.54 | 5.00 | 2.51 | 7.75 | ...... | 8.66 | 1.72 | 10.38 | 10.00 | 1.46 | 1.65 | 28.59 | 24.00<br>25.00<br>32.00 | 263<br>77<br>435 |
| 6.26 | ...... | 15.25 | *21.51 | 22.00 | 2.16 | ...... | 2.16 | 2.00 | 1.73 | 1.65 | 28.27 | 43.00 | 324 |
| *7.08 | 7.50 | 2.81 | 9.89 | 10.00 | .66 | .38 | 1.04 | .50 | 2.35 | 2.47 | 24.87 | 25.00 | 1997 |
| 8.62 | 8.00 | 1.54 | *10.16 | 11.00 | 9.78 | ...... | *9.78 | 10.00 | *2.50 | 3.00 | 35.31 | 35.00<br>..... | 407<br>1247 |
| 7.96 | 8.00 | 1.43 | *9.39 | 11.00 | 3.87 | ...... | 3.87 | 4.00 | 1.01 | .82 | 21.69 | 22.00<br>19.00 | 984<br>1117 |
| *6.51 | 9.00 | 4.80 | *11.31 | 12.00 | 5.38 | ...... | 5.38 | 5.00 | *1.69 | 2.00 | 26.60 | 28.00 | 1933 |
| 10.29 | 8.00 | 2.73 | 13.02 | 11.00 | 5.06 | ...... | *5.06 | 6.00 | *1.58 | 3.00 | 28.68 | 30.00<br>..... | 406<br>1248 |
| 8.57 | 7.00 | 2.84 | 11.41 | 11.00 | 3.31 | ...... | 3.31 | 3.00 | *1.10 | 2.00 | 22.88 | 25.00<br>24.00 | 409<br>1550 |
| 8.78 | 8.00 | 1.91 | *10.79 | 11.00 | 4.14 | ...... | *4.14 | 6.00 | *1.77 | 3.00 | 26.61 | 29.00 | 1984 |
| 7.10 | 7.00 | 1.02 | 8.12 | ...... | 3.18 | ...... | 3.18 | 2.50 | 1.02 | .82 | 19.95 | 18.00 | 1626 |
| 11.48 | 9.00 | .36 | 11.84 | 10.00 | 2.63 | ...... | 2.63 | 1.50 | .41 | .41 | 17.34 | 17.00 | 628 |
| *4.66 | 5.25 | 4.43 | *9.09 | 10.50 | 1.46 | 4.24 | *5.70 | 6.00 | 4.94 | 5.00 | 40.68 | 60.00 | 739 |
| 8.57 | 8.00 | 1.53 | 10.10 | 9.00 | 3.74 | ...... | *3.74 | 4.00 | .77 | .82 | 21.12 | 25.00<br>19.00<br>..... | 318<br>205<br>344 |
| *7.46 | 8.00 | 2.65 | 10.11 | 9.00 | 2.91 | ...... | 2.91 | 2.00 | 1.65 | 1.65 | 23.76 | 26.00 | 748 |
| 10.09 | 10.00 | .96 | 11.05 | 11.00 | 5.44 | ...... | *5.44 | 6.00 | 1.11 | 1.23 | 25.74 | 23.00 | 1376 |
| 6.54 | 6.00 | 1.06 | 7.60 | 7.00 | 9.59 | ...... | *9.59 | 10.00 | 2.33 | 2.47 | 32.10 | .....<br>36.00<br>..... | 845<br>816<br>1104 |
| 6.38 | 6.00 | 1.33 | 7.71 | 7.00 | 2.46 | ...... | 2.46 | 2.00 | *.72 | .82 | 17.76 | 17.50<br>23.00 | 348<br>1402 |
| 8.68 | 8.00 | 1.72 | 10.40 | 9.00 | 2.77 | ...... | *2.77 | 3.00 | .91 | .8[illegible] | 21.01 | .....<br>25.00 | 452<br>670 |
| 8.81 | 8.00 | 1.50 | 10.31 | 9.00 | 4.35 | ...... | 4.35 | 4.00 | *2.21 | 2.47 | 28.57 | 32.00<br>30.00<br>36.00 | 750<br>727<br>1403 |
| 6.74 | 6.00 | 1.19 | 7.93 | 7.00 | 10.50 | ...... | 10.50 | 10.00 | 3.60 | 3.29 | 39.00 | 33.00<br>.....<br>..... | 1740<br>1261<br>1911 |
| 10.98 | 10.00 | 1.08 | 12.01 | 11.00 | 7.53 | ...... | 7.53 | 7.00 | 3.14 | 3.2[illegible] | 38.14 | ..... | 1912 |
| 8.71 | 8.00 | 1.50 | 10.21 | 9.00 | 9.76 | ...... | *9.76 | 10.00 | 1.62 | 1.65 | 31.24 | .....<br>26.00 | 451<br>1378 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 592 | †Bowker's Sure Crop Phosphate, ......... | Hamburg Supply House, Hamburg,.. | 11.18 |
| 349 | | S. A. Fishburn, Penbrook, .......... | |
| 730 | | H. L. Stultz, Hollidaysburg, ... .... | |
| 25 | Bowker's Ammoniated Food for Flowers,.. | W. C. Beckert, Pittsburgh, North Side. | 4.75 |
| | BRADLEY & GREEN FERTILIZER CO., PHILADELPHIA, PA. | | |
| 1022 | Extra High Grade Potato Guano, .......... | Bradley & Green Ftz. Co., Phila., .. | 7.60 |
| 1021 | High Grade Potato Guana, ................. | Bradley & Green Ftz. Co., Phila., .. | 6.53 |
| | CAMBRIA FERTILIZER CO., JOHNSTOWN, PA. | | |
| 931 | B. and B. Phosphate, ........................ | Claude Davis, Windber, ............. | 10.13 |
| 930 | Corn and Potato Manure, ................... | Claude Davis, Windber, ............. | 5.89 |
| 929 | Standard Phosphate, ........................ | Claude Davis, Windber, ............. | 4.70 |
| | CENTRAL CHEMICAL CO., HAGERSTOWN, MD. THOMAS FERTZ. WORKS. | | |
| 1307 | C. C. C. Farmer's Century Brand, .......... | E. W. Rupp, Shiremanstown, ....... | 7.88 |
| 1822 | C. C. C. Atlas Keystone, .................... | H. R. Miller, Huntsdale, .......... | 6.88 |
| 1684 | C. C. C. Golden Sheaf, ....................... | J. A. Witherspoon, Mercersburg, ... | 8.85 |
| 1137 | C. C. C. Crescent Jewel, .................... | W. F. Slagle, Bloomsburg, ... ..... | 7.63 |
| 1141 | C. C. C. Fish Guano, ........................ | W. F. Slagle, Bloomsburg, .......... | 6.25 |
| 883 | C. C. C. Fish, Bone and Potash, ........... | M. G. Adams, Paxinos, ............ | 8.40 |
| 1306 | †C. C. C. Superior Planter's Mixture, .... | E. W. Rupp, Shiremanstown, ....... | 6.68 |
| 1821 | | H. R. Miller, Huntsdale, .......... | |
| 1140 | †C. C. C. Empire, .......................... | W. F. Slagle, Bloomsburg, .......... | 7.00 |
| 532 | | Oliver De Long, Sayersville, ....... | |
| 1685 | | J. A. Witherspoon, Mercersburg, ... | |
| 523 | Excelsior Pheonix, .......................... | Oliver De Long, Sayersville, ........ | 6.38 |
| [illegible] | C. C. C. Farm Favorite, .................... | H. A. Snyder, Fishers Ferry, ....... | 6.01 |
| 41 | C. C. C. Special, ............................ | Morris T. Wood, Downingtown, ..... | 8.80 |
| 8 | C. C. C. Valley Mixture, .................... | E. J. Otto, Herndon, ................ | 8.88 |
| | CHESAPEAKE CHEMICAL CO., THE, BALTIMORE, MD. | | |
| 589 | C. C. Co's English Mixture, ................ | Wm. Biller, Patton, ................ | 6.95 |
| 713 | C. C. Co's Farmer's Favorite, ............. | Wm. Biller, Patton, ................ | 5.90 |
| 711 | C. C. Co's Triumph Guano, .................. | Wm. Biller, Patton, ................ | 7.80 |
| | COE MORTIMER CO., THE, NEW YORK. | | |
| 1982 | E. Frank Coe's Reliable Crop Grower, ...... | J. W. Shoewalter, New Holland, ... | 8.80 |
| 2007 | E. Frank Coe's Penna. Tobacco Special, ... | Newton S. Sprecher, Ephrata, ...... | 4.80 |
| 1611 | E. Frank Coe's Gold Brand Excelsior Guano. | Adolph Boettinger, Danville, ........ | 8.68 |
| 475 | E. Frank Coe's Extra Special Potato Fertilizer and Fruit Grower. | C. J. Easterbrook & Son, Rummerfield. | 7.58 |
| 494 | †E. Frank Coe's Penna. No. 1 Grain Special for Wheat, Rye and Oats. | Floyd Campbell, Athens, ............ | 8.98 |
| 65 | | W. W. Frick & Co., Kutztown, ..... | |
| 1638 | | Milton A. Buck, Kunkletown, ........ | |
| 398 | †E. Frank Coe's Columbia Corn and Potato Fertilizer. | I. W. Scott Co., Pittsburgh, ........ | 10.25 |
| 66 | | W. W. Frick & Co., Kutztown, ..... | |
| 495 | | Floyd Campbell, Athens, ............ | |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 1699 | Columbia Fish, Phosphate and Potash, .... | E. D. Davis, Middleburg Center, ... | 3.58 |
| 1712 | Bully Good Guano, ........................... | Owlett & Twilliger, Galeton, ..... | 1.78 |
| 488 | Columbia Special Potato Guano, ............ | Henry & Bressler, Athens, ......... | 4.08 |
| 1656 | †Columbia Special Potato Formula, ....... | Wm. H. Brinton, Fallscreek, ...... | 7.23 |
| 1500 | | Jno. Kelsa, Mansfield, ............. | |
| 1960 | | John Cook, Bushkill, ............... | |
| 1711 | †Columbia General Crop Manure, ......... | Owlet & Twilliger, Galeton, ....... | 12.20 |
| 1961 | | John Cook, Bushkill, ............... | |
| 50 | Columbia Grain Special Fertilizer, ......... | Thomas Prosinger, Reeders, ......... | 7.54 |
| | HENRY COPE & CO., LINCOLN UNIVERSITY, PA. | | |
| 1946 | Henry Cope & Co's Ammoniated Phosphate, | Lyburn Whitaker, Oxford, .......... | 13.18 |
| 1542 | Potato and Corn Phosphate, ................ | Thos. Haines & Co., Malvern, ... . | 11.63 |

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†Composite sample.

LIZERS—Continued

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.25 | 9.00 | 1.40 | 10.65 | 10.00 | 2.27 | ...... | 2.27 | 2.00 | .86 | .82 | 20.67 | 20.00<br>19.50<br>20.00 | 592<br>349<br>730 |
| 6.94 | ...... | 1.49 | 8.43 | ...... | .80 | 3.14 | 3.94 | 2.00 | 3.11 | 2.47 | 31.14 | ..... | 25 |
| 7.00 | 6.00 | 1.20 | 8.20 | 7.00 | 8.98 | .14 | •9.08 | 10.00 | •2.89 | 3.29 | 34.66 | 33.00 | 1022 |
| 8.51 | 8.00 | 1.52 | 10.03 | 9.00 | 10.81 | ...... | 10.81 | 10.00 | 1.71 | 1.65 | 32.61 | 28.00 | 1021 |
| 6.49 | 6.50 | 2.04 | 8.53 | 8.00 | 2.79 | ...... | 2.79 | 2.00 | •.86 | 1.00 | 18.75 | 22.00 | 981 |
| 7.47 | 6.00 | 1.86 | 9.33 | 7.00 | 9.03 | ...... | 9.03 | 8.00 | 1.52 | 1.50 | 29.01 | 32.00 | 980 |
| 6.41 | 6.00 | 2.27 | 8.68 | 7.00 | 5.40 | ...... | 5.40 | 3.00 | 1.76 | 1.50 | 25.54 | 25.00 | 980 |
| 8.04 | 8.00 | 8.28 | 8.32 | ...... | 2.64 | ...... | 2.64 | 2.00 | .81 | .82 | 19.08 | 18.00 | 1307 |
| 8.34 | 8.00 | .28 | 8.62 | ...... | 4.96 | ...... | 4.96 | 4.00 | •.57 | .82 | 20.60 | 20.00 | 1822 |
| •7.26 | 8.00 | .50 | 7.76 | ...... | 1.38 | ...... | 1.38 | 1.00 | 1.15 | .82 | 18.70 | 16.00 | 1684 |
| 9.22 | 9.00 | .37 | 9.59 | ...... | 3.89 | ...... | 3.89 | 3.00 | .81 | .82 | 21.68 | 21.00 | 1187 |
| •7.75 | 8.00 | .45 | 8.20 | ...... | 4.62 | ...... | 4.62 | 4.00 | .86 | .82 | 21.00 | 22.00 | 1141 |
| 7.19 | 7.00 | .35 | 7.54 | ...... | 3.43 | ...... | 3.43 | 3.00 | •.84 | 1.04 | 19.21 | 21.00 | 888 |
| 8.08 | 8.00 | .31 | 8.39 | ...... | 6.23 | ...... | 6.23 | 6.00 | .84 | .82 | 23.06 | 21.00 | 1806 |
| 8.39 | 8.00 | .38 | 8.77 | ... | 8.00 | 2.29 | 10.29 | 10.00 | 1.68 | 1.65 | 31.95 | 21.00<br>22.00<br>.....<br>30.00 | 1821<br>1140<br>582<br>1685 |
| 8.16 | 8.00 | .28 | 8.44 | ...... | 4.59 | ...... | 4.59 | 4.00 | 1.50 | 1.65 | 24.39 | ..... | 628 |
| 9.56 | 8.00 | .51 | 10.07 | 9.00 | 3.16 | ...... | 3.16 | 3.00 | .59 | .41 | 20.34 | ..... | 6 |
| 8.51 | 8.00 | .58 | 9.09 | ...... | 3.60 | 4.31 | 7.91 | 8.00 | 1.60 | 1.65 | 29.78 | 22.50 | 41 |
| 8.51 | 8.00 | .61 | 9.12 | ...... | 2.19 | ...... | 2.19 | 2.00 | •1.27 | 1.65 | 21.31 | 21.50 | 8 |
| 7.31 | 8.00 | 1.09 | 8.90 | 9.00 | 6.21 | ...... | 6.21 | 5.00 | .95 | 1.00 | 23.54 | 20.00 | 589 |
| 7.04 | 7.00 | 1.12 | 8.16 | 8.00 | 4.76 | ...... | 4.76 | 4.00 | .82 | .82 | 20.88 | 18.00 | 713 |
| •7.03 | 8.00 | 2.67 | 9.70 | 9.00 | 9.90 | ...... | 9.90 | 10.00 | 1.60 | 1.64 | 30.26 | 27.00 | 711 |
| 9.45 | 9.00 | 1.85 | 11.30 | 10.00 | 4.42 | ...... | •4.42 | 5.00 | 1.76 | 1.65 | 27.39 | 23.00 | 1982 |
| 6.28 | 6.00 | .98 | 7.26 | 7.00 | 1.33 | 8.98 | 10.31 | 10.00 | •1.75 | 2.47 | 31.89 | 37.00 | 2007 |
| 8.97 | 8.00 | 1.34 | 10.31 | 9.00 | 6.62 | ...... | 6.62 | 6.00 | •2.20 | 2.47 | 30.94 | 30.00 | 1611 |
| 7.97 | 8.00 | 2.33 | 10.30 | 9.00 | 10.44 | ...... | 10.44 | 10.00 | 1.56 | 1.65 | 31.96 | 25.30 | 475 |
| 8.43 | 8.00 | 1.40 | 9.83 | 9.00 | 3.86 | ...... | 3.86 | 3.00 | 1.01 | .82 | 22.17 | 21.00<br>21.00<br>22.00 | 494<br>65<br>1638 |
| 8.58 | 8.50 | 1.75 | 10.33 | 9.50 | 3.77 | ...... | 3.77 | 2.50 | •.86 | 1.23 | 21.72 | 27.00<br>24.00<br>22.50 | 808<br>66<br>493 |
| 8.34 | 8.00 | 1.22 | 9.56 | 8.50 | 3.13 | ...... | 3.13 | 3.00 | 1.63 | 1.65 | 24.24 | 27.00 | 1699 |
| 7.95 | 6.00 | 1.93 | 9.88 | 6.50 | 4.88 | ...... | 4.88 | 5.00 | 1.48 | 1.23 | 25.29 | 27.00 | 1712 |
| •4.65 | 5.00 | 1.00 | 5.65 | 5.50 | 9.30 | .95 | 10.25 | 10.00 | 1.46 | 1.65 | 26.92 | 28.00 | 488 |
| •7.49 | 8.00 | 2.32 | 9.81 | 8.50 | 10.07 | ...... | 10.07 | 10.00 | 1.70 | 1.65 | 31.16 | 28.50<br>30.00<br>31.00 | 1656<br>1500<br>1960 |
| 7.99 | 8.00 | 1.30 | 9.29 | 8.50 | 4.76 | ...... | 4.76 | 4.00 | 98 | .82 | 22.59 | 24.00<br>24.00 | 1711<br>1961 |
| •7.59 | 8.00 | 1.77 | 9.36 | 8.50 | 2.71 | ...... | 2.71 | 2.00 | 1.02 | .82 | 20.31 | 21.00 | 50 |
| 9.84 | 7.00 | 1.43 | 11.27 | 9.00 | 3.76 | ...... | 3.76 | 2.00 | .94 | 1.00 | 23.28 | 21.00 | 1946 |
| 8.08 | 7.00 | .64 | •8.72 | 9.00 | 5.81 | ...... | 5.81 | 4.00 | 1.20 | 1.25 | 24.31 | 23.00 | 1542 |

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•Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | JOSIAH COPE & CO., BALTIMORE, MD. | | |
| 1541 | Josiah Cope & Co. Ammoniated Phosphate, | Henry Wilson, Frazer, | 7.65 |
| 1553 | Josiah Cope & Co. Potato and Tobacco Phosphate. | Jas. Eavenson, Christiana, | 7.68 |
| 1552 | Josiah Cope & Co. Pure Bono Phosphate, | Jas. Eavenson, Christiana, | 7.20 |
| 1929 | Josiah Cope & Co. Try Me Fertilizer, | F. E. Bailey, Northbrook, | 8.30 |
| | JAMES G. DOWNWARD CO., COATESVILLE, PA. | | |
| 415 | †All Crop Fertilizer, | Ed. Miller, New London, | 7.48 |
| 1267 | | H. E. Lehman, Palmyra, | |
| 413 | †Ammoniated Phosphate, | Ed. Miller, New London, | 6.78 |
| 2023 | | Abram Reese, New Providence, | |
| 1527 | Corn, Wheat and Grass Special, | S. Harry Hibbs, Hulmerville, | 4.80 |
| 1519 | High Grade Pioneer for Tobacco, | Jas. G. Downward, Coatesville, | 6.20 |
| 414 | Special Potato Fertilizer, | Ed. Miller, New London, | 5.58 |
| | WALLACE DUNGAN, DOYLESTOWN, PA. | | |
| 1548 | Pebble Hill Home Made Animal Mixture, | Wallace Dungan, Doylestown, | 7.95 |
| 1549 | Potato Manure, | Wallace Dungan, Doylestown, | 6.53 |
| | AMOS EBY & CO., LEAMAN PLACE, PA. | | |
| 2010 | Pequla Ammoniated, | Ira B. Grabill, Refton, | 9.20 |
| 2011 | Pequla Valley Fertilizer, | Ira B. Grabill, Refton, | 7.13 |
| | ERIE REDUCTION CO., ERIE, PA. | | |
| 817 | Erie Corn and Oat Special, | Chas. Hartly, North East, | 5.45 |
| 818 | Erie Favorite, | Jas. Dobson, North East, | 7.00 |
| 815 | Erie Grain Special, | Gust Schultz, North East, | 7.48 |
| 809 | Erie Potato and Truck Special, | Theilman Seed Co., Erie, | 7.08 |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | | |
| 1302 | †Eureka Complete Compound, | I. D. Beitzel, Mechanicsburg, | 6.29 |
| 790 | | Geo. Zimmerman, Cowan, | |
| 1357 | | C. I. Saylor, Felton, | |
| 1318 | †Eureka Fish and Potash, | N. E. Galbrecht & Bro., Hanover, | 5.83 |
| 1301 | | D. J. Beitzel, Mechanicsburg, | |
| 2015 | | New Prov. Coal Co., New Providence. | |
| 343 | †Eureka High Grade Trucker, | Daniel Mader, Linglestown, | 7.65 |
| 1105 | | Henry Oberlin, Reinholds, | |
| 506 | †Eureka Grain and Grass, | Wm. Schwartz, Cressona, | 6.45 |
| 2014 | | New Prov. Coal Co., New Providence. | |
| 1303 | †Eureka Potato and Vegetable, | O. J. Beitzel, Mechanicsburg, | 7.25 |
| 781 | | M. C. Catherman, Millmont, | |
| 2013 | | New Prov. Coal Co., New Providence. | |
| | FARMERS' FERTILIZER WORKS, THE, ELIZABETHTOWN, PA. | | |
| 1862 | Best Yet, | Duncannon Flouring Mill Co., Duncannon. | 3.83 |
| 329 | Grain and Grass Special, | John Sheetz, Elizabethville, | 8.35 |
| 328 | Pride of Donegal, | John Sheetz, Elizabethville, | 6.13 |
| 341 | †Special Potato and Tobacco Manure, | M. G. Stricker, Dauphin, | 5.65 |
| 1833 | | B. F. Horting, Newport, | |
| | W. S. FARMER & CO., BALTIMORE, MD. | | |
| 1360 | W. S. Farmer & Co's Climate Phosphate, | D. J. Trout, Stewartstown, | 7.05 |
| 1361 | W. S. Farmer & Co's Diamond Back Brand. | D. J. Trout, Stewartstown, | 8.95 |
| 1359 | W. S. Farmer & Co's Pelican Guano, | D. J. Trout, Stewartstown, | 6.25 |
| 43 | W. S. Farmer & Co's Clyde Brand, | J. W. Shoemaker, Littlestown, | 11.23 |
| 44 | W. S. Farmer & Co's Harvest Queen, | J. W. Shoemaker, Littlestown, | 12.72 |
| | JOS. R. GAWTHROP, KENNETT SQUARE, PA. | | |
| 393 | Special Potato Phosphate, | Jos. R. Gawthrop, Kennett Square | 4.98 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.62 | 8.00 | .66 | 10.28 | 9.00 | 2.26 | ...... | *2.26 | 3.00 | *.42 | .82 | 15.70 | 23.00 | 1541 |
| 10.59 | 10.00 | 1.87 | 12.46 | 11.00 | 6.74 | ...... | *6.74 | 7.00 | .87 | .82 | 26.86 | 25.00 | 1553 |
| 10.10 | 9.00 | 5.84 | 15.94 | 13.50 | 3.88 | ...... | 3.88 | 4.00 | 1.85 | 1.85 | 29.94 | 26.00 | 1552 |
| 7.86 | 8.00 | 1.78 | 9.64 | 9.00 | 5.49 | ...... | 5.49 | 4.00 | *1.31 | 1.65 | 24.85 | 24.00 | 1929 |
| 7.83 | 7.00 | .91 | 8.74 | 8.00 | 3.86 | ...... | 3.86 | 3.00 | .42 | .41 | 16.12 | 19.00 | 415 |
| | | | | | | | | | | | | 19.00 | 1267 |
| 8.11 | 7.00 | .80 | 8.91 | 8.00 | 3.69 | ...... | 3.69 | 3.50 | .83 | .82 | 20.71 | 24.00 | 418 |
| | | | | | | | | | | | | ..... | 2025 |
| 9.53 | 7.00 | .80 | 10.33 | ...... | 4.06 | ...... | 4.06 | 3.50 | 1.61 | 1.65 | 25.95 | ..... | 1527 |
| 8.27 | 6.00 | 1.19 | 9.46 | 7.00 | 4.26 | ...... | *4.26 | 5.00 | *2.84 | 3.28 | 30.72 | ..... | 1519 |
| 7.26 | 7.00 | 1.20 | 8.46 | 8.00 | 6.48 | ...... | 6.48 | 5.00 | 1.21 | 1.24 | 24.48 | 27.00 | 414 |
| *6.95 | 9.00 | 6.02 | 12.97 | 12.00 | 6.53 | ...... | 6.53 | 5.00 | *2.58 | 3.2 | 32.91 | 30.00 | 1548 |
| *5.12 | 7.00 | 3.92 | 9.04 | 9.00 | 10.80 | .74 | 11.54 | 10.00 | 3.03 | 3.07 | 37.38 | 32.00 | 1549 |
| 11.25 | 10.00 | 1.40 | 12.65 | 12.00 | 2.68 | ...... | 2.68 | 2.00 | .93 | .82 | 23.64 | 20.00 | 2010 |
| 9.49 | 8.00 | 1.58 | 11.02 | 9.00 | 9.06 | 1.60 | 10.66 | 10.00 | 1.60 | 1.65 | 33.32 | 28.00 | 2011 |
| 8.78 | ‡8.00 | 1.81 | 10.59 | ...... | 4.72 | ...... | 4.72 | 4.00 | .83 | .82 | 22.92 | 21.50 | 817 |
| 9.20 | ‡8.00 | 3.04 | 12.24 | ...... | 2.28 | ...... | 2.28 | 2.00 | *1.39 | 1.64 | 23.98 | 22.50 | 818 |
| 9.25 | ‡8.00 | 2.11 | 11.36 | ...... | 2.85 | ...... | 2.85 | 2.00 | 2.33 | 2.46 | 28.46 | 25.00 | 815 |
| 8.46 | ‡7.00 | 1.98 | 10.44 | ...... | 10.10 | ...... | 10.10 | 10.00 | *1.82 | 2.46 | 32.49 | 33.00 | 809 |
| 7.68 | 7.00 | .73 | 8.41 | 7.50 | 5.24 | ...... | 5.24 | 5.00 | .85 | .82 | 21.79 | 20.00 | 1302 |
| | | | | | | | | | | | | 19.25 | 790 |
| | | | | | | | | | | | | 19.00 | 1357 |
| 8.34 | 8.00 | .99 | 9.33 | 8.50 | 1.90 | ...... | 1.90 | 1.00 | .71 | .41 | 18.54 | 15.00 | 1318 |
| | | | | | | | | | | | | 15.00 | 1301 |
| | | | | | | | | | | | | 15.00 | 2015 |
| 8.64 | 8.00 | .93 | 9.57 | 8.50 | 9.84 | ...... | 9.84 | 10.00 | 1.63 | 1.65 | 31.20 | 30.00 | 343 |
| | | | | | | | | | | | | 30.00 | 1105 |
| 8.92 | 8.00 | .54 | 9.46 | 8.50 | 3.01 | ...... | 3.01 | 2.00 | .85 | .82 | 20.68 | 16.20 | 506 |
| | | | | | | | | | | | | 18.00 | 2014 |
| 8.77 | 8.00 | .89 | 9.66 | 8.50 | 4.52 | ...... | 4.52 | 4.00 | 1.76 | 1.65 | 26.34 | 24.00 | 1303 |
| | | | | | | | | | | | | 22.00 | 781 |
| | | | | | | | | | | | | 24.00 | 2013 |
| 9.26 | 8.00 | 1.26 | 10.52 | ...... | 2.00 | 8.52 | 10.52 | 10.00 | 1.63 | 1.6 | 34.71 | 26.00 | 1862 |
| 8.77 | 8.00 | 1.02 | 9.79 | ...... | 4.83 | ...... | 4.83 | 4.00 | .96 | .82 | 23.13 | 19.00 | 329 |
| 7.79 | 7.00 | 2.05 | 9.84 | ...... | 3.60 | 5.05 | 8.65 | 5.00 | 1.66 | 1.65 | 30.90 | 23.00 | 328 |
| 7.12 | 6.00 | 1.54 | 8.66 | ...... | 1.33 | 10.35 | 11.68 | 10.00 | 2.38 | 2.47 | 37.76 | 32.00 | 341 |
| | | | | | | | | | | | | 29.00 | 1833 |
| 7.73 | 7.00 | 1.09 | 8.82 | 8.00 | 4.44 | ...... | 4.44 | 4.00 | .90 | .82 | 21.43 | 18.00 | 1360 |
| 9.15 | 8.00 | .96 | 10.10 | 9.00 | 4.61 | ...... | *4.61 | 5.00 | 1.28 | 1.03 | 24.81 | 22.00 | 1361 |
| 6.24 | 6.00 | .81 | 7.05 | 7.00 | 2.53 | ...... | *2.53 | 3.00 | .51 | .41 | 16.04 | 16.00 | 1359 |
| 8.48 | 8.00 | 1.11 | 9.59 | 9.00 | 2.21 | ...... | 2.21 | 2.00 | .87 | .82 | 19.72 | 17.50 | 43 |
| 8.81 | 9.00 | 1.81 | 10.62 | 10.00 | 3.32 | ...... | 3.32 | 3.00 | 1.14 | 1.03 | 22.85 | 19.50 | 44 |
| 6.57 | 5.00 | .90 | 7.47 | 6.00 | .66 | 2.53 | 3.19 | 3.00 | 1.11 | 82 | 20.41 | 27.00 | 399 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | | |
| 1190 | †Griffith & Boyd's Cereal Plant Food, ... | Adam Krug, Allenwood, ............. | 7.83 |
| 616 | | H. J. Van Dyke, Gettysburg, ...... | |
| 1596 | | Bear & Long, Lititz, ................ | |
| 1093 | †Griffith & Boyd's Double Strength Tobacco Grower. | Elias Wolf, Akron, ................ | 7.35 |
| 1332 | | Geo. W. Wolf's Sons, York, ........ | |
| 403 | †Griffith & Boyd's Farmer's Potato Manure. | Passmore Co., Nottingham, ......... | 8.28 |
| 201 | | John Hostetler, Walnut, ........... | |
| 521 | | Jas. Lochner, New Tripoli, .......... | |
| 628 | †Griffith & Boyd's Gilt Edge Crop Guano, | J. F. Kuntz, New Tripoli, .......... | 5.60 |
| 180 | | A. K. Kulp, Pottstown, ............. | |
| 223 | †Griffith & Boyd's Farmer's Improved Phosphate. | John Hostetler, Walnut, .......... | 7.73 |
| 1334 | | Geo. Wolf's Sons, Mt. Wolf, ....... | |
| 1939 | Griffith & Boyd's Vegetable Bone, .......... | E. B. Ruhl & Son, Manheim, ....... | 8.95 |
| | FRANK HARTRANFT, COATESVILLE, PA. | | |
| 1002 | Potato Phosphate, ............................ | Preston Powell, West Grove, ....... | 8.88 |
| 1001 | Cook's Phosphate, ............................ | Preston Powell, West Grove, ....... | 9.85 |
| 1000 | Special Phosphate, ........................... | Preston Powell, West Grove, ........ | 12.50 |
| 1014 | Spring Crop Grower Phosphate, ............ | Preston Powell, West Grove, ........ | 9.68 |
| | W. S. HASTINGS & SON, ATGLEN, PA. | | |
| 1511 | Atglen Brand, ................................ | W. S. Hastings & Son, Atglen, ...... | 7.85 |
| | S. M. HESS & BRO., INC., PHILADELPHIA, PA. | | |
| 1074 | S. M. Hess & Bro. Jumbo Complete Formula. | H. D. Weist, Tulpehocken, .......... | 8.55 |
| 546 | †S. M. Hess & Bro. Potato and Truck Manure. | J. F. Mary, Allentown, R. D. 2, ... | 9.58 |
| 213 | | C. W. Book, Port Royal, ............ | |
| 1603 | | J. W. Hartman, Kauffmans, ......... | |
| 117 | †S. M. Hess & Bro. Special Corn Manure, | Irvin Basor, Mifflintown, ............ | 10.58 |
| 99 | | Stephen H. Mast, Elverson, ......... | |
| 376 | | A. F. Hengst, Osterburg, ........... | |
| 714 | S. M. Hess & Bro. Superior Potash Mixture. | C. W. Book, Port Royal, ........... | 8.78 |
| 108 | | Jas. Westley, Mohnton, ............. | |
| 353 | | Geo. F. Wass, Addison, ............. | |
| 1858 | S. M. Hess & Bro., The Scientific Manure, | J. E. Cooper, Landisburg, .......... | 6.68 |
| 215 | †S. M. Hess & Bro. Keystone Phosphate, | C. W. Book, Port Royal, ............. | 8.15 |
| 97 | | Stephen H. Mast, Elverson, R. D. No. 3. | |
| 352 | | J. R. Davis & Sons, Ursina, ........ | |
| 657 | †S. M. Hess & Bro. Special Compound, .. | Harvey T. Troxell, Allentown, Pa., | 9.10 |
| 96 | | Stephen H. Mast, Elverson, ........ | |
| 1200 | | C. A. Shatzberger, Freeburg, ........ | |
| 38 | S. M. Hess & Bro. Tobacco Manure, ........ | Benj. J. Weidner, Lititz, ............ | 8.48 |
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 277 | †Hubbard's Climax Phosphate, ............ | Biglerville Warehouse Co., Biglerville. | 10.63 |
| 192 | | H. M. Ower, Lewistown, ............ | |
| 296 | | J. H. Romberger, Elizabethville, .. | |
| 190 | †Hubbard's Columbia Gem Phosphate, ... | H. M. Ower, Lewistown, ........... | 6.10 |
| 151 | | J. B. Spera, Dillsburg, ............. | |
| 1605 | | D. C. Shuman, Bloomsburg, ........ | |
| 1319 | †Hubbard's Farmer's I. X. L., ........... | J. Emory Maul, Iron Ore, ........... | 5.80 |
| 576 | | F. P. Waite, Tyrone, ............... | |
| 1380 | | J. H. Umbel & Bro., Bird-in-Hand, | |
| 191 | †Hubbard's Jersey Trucker, .............. | H. M. Ower, Lewistown, ........... | 12.05 |
| 141 | | J. B. Spera, Dillsburg, ............ | |
| 575 | | F. P. Waite, Tyrone, ............ | |
| 911 | †Hubbard's Jewel Phosphate, ............ | Howard Bucket, Cessna, ......... | 6.00 |
| 142 | | J. B. Spera, Dillsburg, ............ | |
| 1202 | | L. L. Spangler, Mifflinburg, ........ | |
| 1915 | Hubbard's Money Maker. .................. | James Thompson, Lemont, ......... | 7.78 |
| 899 | Hubbard's Royal Ensign, .................. | Sam'l Rarig, Catawissa, ............ | 5.85 |
| | INTERNATIONAL AGRICULTURAL CORPORATION, PA. BRANCH, BUFFALO, N. Y. | | |
| 2107 | Economy, ...................................... | J. M. Raab & Bro., Midway, ........ | 9.08 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.36 | 8.00 | 2.68 | 11.04 | 9.00 | 2.48 | ...... | 2.48 | 2.00 | .84 | .85 | 20.65 | 18.00<br>20.00<br>21.00 | 1190<br>616<br>1596 |
| 8.31 | 8.00 | 1.76 | 10.07 | 9.00 | 2.82 | ...... | 2.82 | 3.00 | *1.80 | 2.50 | 24.78 | 28.00<br>17.00 | 1098<br>1332 |
| 8.81 | 8.00 | 1.11 | 9.92 | 9.00 | 9.14 | ...... | 9.14 | 9.00 | .80 | .85 | 26.89 | 25.00<br>24.00<br>24.00 | 403<br>201<br>521 |
| 7.85 | 8.00 | 1.72 | 9.57 | 9.00 | 10.50 | ...... | 10.50 | 10.00 | 1.67 | 1.65 | 31.46 | 26.50<br>30.00 | 528<br>980 |
| 8.81 | 7.00 | 3.63 | 12.44 | 8.00 | 2.64 | ...... | 2.64 | 2.00 | .81 | .85 | 21.48 | .....<br>18.00 | 223<br>1334 |
| 8.50 | 8.00 | .40 | 8.90 | 9.00 | 5.72 | ...... | *5.72 | 7.00 | 2.34 | 2.50 | 29.80 | ..... | 1989 |
| 9.24 | 8.00 | 1.34 | 10.58 | 9.00 | 6.52 | ...... | *6.52 | 8.00 | .89 | .82 | 24.70 | 28.00 | 1002 |
| 10.33 | 7.00 | 1.52 | 11.85 | 12.00 | 4.91 | ...... | 4.91 | 3.00 | *1.12 | 1.65 | 25.70 | 30.00 | 1001 |
| 11.98 | 10.00 | 1.66 | 13.64 | 11.00 | 2.78 | ...... | 2.78 | 2.00 | .90 | .82 | 24.44 | 22.00 | 1000 |
| 11.82 | 10.00 | 1.24 | 12.06 | 11.00 | 3.50 | ...... | 3.50 | 2.00 | .61 | .41 | 20.38 | 18.00 | 1014 |
| 8.63 | 8.00 | .60 | 9.23 | ...... | 5.80 | ...... | 5.80 | 5.00 | 1.63 | 1.65 | 27.06 | 23.00 | 1511 |
| 7.89 | 7.00 | 1.16 | 8.96 | 8.00 | 1.65 | ...... | 1.65 | 1.00 | 1.14 | .82 | 19.83 | 20.00 | 1074 |
| 9.17 | 8.00 | 1.28 | 10.45 | 9.00 | 6.33 | ...... | 6.33 | 6.00 | 2.45 | 2.47 | 32.01 | 32.50<br>30.00<br>28.50 | 546<br>213<br>1693 |
| 8.69 | 8.00 | 1.28 | 9.97 | 9.00 | 2.10 | ...... | 2.10 | 2.00 | .82 | .82 | 19.90 | .....<br>24.00<br>19.00 | 197<br>98<br>376 |
| 8.16 | 8.00 | 1.31 | 9.47 | 9.00 | 10.16 | ...... | 10.16 | 10.00 | *1.43 | 1.65 | 30.31 | 29.50<br>30.00<br>32.00 | 214<br>108<br>353 |
| 6.13 | 6.00 | 1.28 | 7.41 | 7.00 | 6.21 | ...... | 6.21 | 5.00 | 1.54 | 1.23 | 24.67 | ..... | 1858 |
| 8.66 | 8.00 | 1.28 | 9.94 | 9.00 | 1.38 | ...... | 1.38 | 1.00 | .75 | .82 | 18.69 | 20.00<br>22.00<br>..... | 215<br>97<br>352 |
| *7.67 | 8.00 | 2.06 | 9.73 | 9.00 | 4.58 | ...... | 4.58 | 4.00 | .84 | .82 | 21.81 | 23.50<br>24.00<br>19.50 | 557<br>96<br>1208 |
| 9.38 | 8.00 | .87 | 10.25 | 9.00 | 4.85 | ...... | *4.85 | 6.00 | *1.78 | 2.47 | 27.55 | ..... | 38 |
| *6.55 | 7.00 | 2.09 | 8.64 | 8.00 | 4.58 | ...... | 4.58 | 4.00 | .82 | .82 | 20.48 | 20.00<br>21.00<br>19.00 | 277<br>192<br>296 |
| 7.93 | 8.00 | .87 | *8.80 | 9.00 | 3.14 | ...... | 3.14 | 2.00 | .46 | .41 | 15.70 | 18.00<br>16.50<br>15.00 | 190<br>151<br>1606 |
| *7.75 | 8.00 | 1.57 | 9.32 | 9.00 | 3.53 | ...... | 3.53 | 2.00 | 1.79 | 1.64 | 24.88 | 21.00<br>22.00<br>21.00 | 1319<br>576<br>1580 |
| 8.37 | 8.00 | .62 | 8.99 | 9.00 | 9.27 | ...... | *9.27 | 10.00 | 1.83 | 1.64 | 31.12 | 30.00<br>28.00<br>32.00 | 191<br>141<br>575 |
| *7.60 | 8.00 | .94 | *8.54 | 9.00 | 7.89 | ...... | 7.89 | 5.00 | 1.83 | 1.00 | 29.11 | 22.00<br>22.00<br>16.00 | 911<br>142<br>1202 |
| 8.30 | 8.00 | 1.76 | 10.06 | 9.00 | 4.67 | ...... | *4.67 | 5.00 | 1.69 | 1.64 | 26.71 | ..... | 1915 |
| 8.38 | 8.00 | 1.49 | 9.87 | 9.00 | 4.95 | ...... | 4.95 | 4.00 | 2.40 | 2.46 | 29.62 | 25.00 | 899 |
| 8.15 | 8.00 | 1.85 | 10.00 | 9.00 | 4.45 | ...... | 4.45 | 4.00 | 1.76 | 1.60 | 26.12 | 22.00 | 2197 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y. | | |
| 1456 | †Fish Guano, | H. B. Edwards & Co., Titusville, | 7.25 |
| 1780 | | C. D. Bower & Bro., Berwick, | |
| 1476 | Garden Truck, | H. B. Hoon, Mercer, | 8.78 |
| 10 | General Favorite, | J. M. Owens, Strattonville, | 13.63 |
| 1753 | †Ideal Wheat and Corn, | Harmony Cereal Mills, Harmony, | 9.60 |
| 1477 | | H. B. Hoon, Mercer, | |
| 1901 | | D. H. Shivery, Bellefonte, | |
| 170 | Vegetable and Potato, | J. Wilson Hamilton, Meadville, | 11.70 |
| | JARECKI CHEMICAL CO., THE, SANDUSKY, OHIO. | | |
| 161 | Fish Phosphate and Potash Tobacco and Potato Food. | C. S. Garwood, Linesville, | 12.20 |
| 1459 | Lake Erie Guano with Phosphate and Potash. | Clark Bros., Oil City, | 9.93 |
| 2193 | No. One Formula, | J. M. Raab & Bro., Midway, | 5.25 |
| | KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA. | | |
| 1543 | Keystone Corn and Cereal Grower, | Wm. M. Holbert, Warrington, | 9.53 |
| 1777 | Keystone Gold Medal Special, | P. K. Smith, Nescopeck, | 6.33 |
| 661 | †Keystone 20th Century Special, | E. A. Slagle, Paxinos, | 7.10 |
| 1774 | | P. K. Smith, Nescopeck, | |
| | LANCASTER BONE FERTILIZER CO., LANCASTER, PA. | | |
| 819 | †Complete Ammoniated Bone Manure, | A. L. Veit, McKean, | 7.23 |
| 396 | | Daniel Replogle, Woodbury, | |
| 1346 | | Josiah Thrichbaugh, Windsor, | |
| 637 | National Crop Grower, | J. H. Duttera, New Oxford, | 10.43 |
| 873 | †Potato, Fruit and Vegetable, | Chas. Oster, Elk Lick, | 6.43 |
| 877 | | E. M. Wenger, Fredericksburg, | |
| 874 | †Potato, Tobacco and Truck Manure, | S. Z. Gettle, Myerstown, | 7.33 |
| 1345 | | Josiah Thrichbaugh, Windsor, | |
| 820 | †Special Guano, | A. L. Veit, McKean, | 5.83 |
| 1344 | | Josiah Thrichbaugh, Windsor, | |
| | LANCASTER CHEMICAL CO., LANCASTER, PA. | | |
| 772 | General Crop Special, No. 15, | Emil Ward, Thompsontown, | 9.58 |
| 773 | Hard Times Fertilizer, No. 6, | Emil Ward, Thompsontown, | 6.10 |
| 203 | Keystone Brand, No. 11, | C. S. Winey, McAlisterville, | 11.33 |
| 1115 | No. 1 Tobacco and Vegetable, | J. B. Myers, Leola, | 3.33 |
| 1116 | No. 2 Dewey Brand for Tobacco and Spring Crops. | J. B. Myers, Leola, | 7.00 |
| | LEBANON FERTILIZER WORKS, LEBANON, PA. | | |
| 500 | Levan's Harvest Queen Fertilizer, | Horace Kintzel, Pine Grove, | 5.05 |
| 876 | Levan's Royal Potash Compound, | M. L. Bachman, Lebanon, | 8.50 |
| 509 | †Levan's Special Corn Fertilizer, | Ed. Mayberry, Pine Grove, | 7.13 |
| 1071 | | Adam Gerhart, Rehresburg, | |
| 1273 | Levan's Special Potato and Tobacco, | Christian M. Brandt, Palmyra, | 6.20 |
| 1255 | †Levan's Special Truck Fertilizer, | C. F. Snyder, Snyders, | 7.15 |
| 1796 | | Frank Gerhart, Orwigsburg, | |
| 1272 | Levan's Wheat and Grass Special, | Christian M. Brandt, Palmyra, | 7.28 |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | | |
| 1056 | †Lister's Corn and Potato Frtilizer. | Morrow & Buxton, Valencia, | 9.63 |
| 1331 | | J. E. Smith, York, | |
| 232 | †Lister's G. Brand, | Knecht Milling Co., Parvin, | 10.50 |
| 158 | | Wm. H. Schriver, Dillsburg, | |
| 292 | | Uriah Daniel, Gratz, | |
| 518 | †Lister's New York Special Fertilizer, | R. D. Sames, Coopersburg, | 9.45 |
| 201 | | Uriah Daniel, Gratz, | |
| 779 | | R. J. Bigaman, Mifflinburg, | |

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†Composite sample.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.84 | 9.00 | 2.00 | 10.84 | 10.00 | 2.65 | ...... | 2.65 | 2.00 | .87 | .80 | 20.96 | 22.00<br>18.50 | 1456<br>1780 |
| 8.19 | 8.00 | 1.67 | 9.86 | 9.00 | 6.13 | 1.08 | 7.21 | 7.00 | 3.53 | 3.30 | 37.36 | 34.00 | 1476 |
| 7.91 | 8.00 | 1.78 | 9.69 | 9.00 | 5.31 | ...... | 5.31 | 2.50 | *.80 | 1.20 | 22.39 | 22.50 | 10 |
| 9.10 | 9.00 | 1.72 | 10.82 | 10.00 | 5.66 | ...... | 5.66 | 5.00 | 1.84 | 1.60 | 28.70 | 24.00<br>25.50<br>..... | 1758<br>1477<br>1901 |
| 8.71 | 8.00 | .89 | 9.60 | 9.00 | 8.37 | ...... | 8.37 | 7.00 | 2.51 | 2.40 | 33.63 | 28.00 | 170 |
| 8.92 | 8.00 | 1.36 | 10.28 | 9.00 | 3.90 | ...... | 3.90 | 4.00 | 1.21 | .83 | 23.64 | 23.00 | 104 |
| 8.82 | 8.00 | 1.70 | 10.52 | 9.00 | 2.43 | ...... | 2.43 | 2.50 | 1.29 | 1.25 | 22.16 | 26.00 | 1459 |
| *6.88 | 8.00 | 2.06 | 8.94 | 9.00 | 2.06 | ...... | 2.06 | 2.00 | .94 | .82 | 18.85 | 21.00 | 2198 |
| *7.78 | 8.00 | 1.16 | 8.94 | 9.00 | 5.42 | ...... | 5.42 | 4.00 | 1.72 | 1.65 | 26.17 | 27.00 | 1546 |
| 8.56 | 8.00 | 1.29 | 9.85 | 10.00 | 6.67 | 3.61 | 10.28 | 10.00 | 3.14 | 3.28 | 39.49 | 34.00 | 1777 |
| 8.01 | 5.00 | 1.05 | 9.06 | 6.00 | 10.42 | ...... | 10.42 | 10.00 | 1.27 | 1.23 | 29.37 | 25.00<br>25.00 | 661<br>1774 |
| 7.95 | 8.00 | .77 | *8.72 | 9.00 | 2.45 | ...... | 2.45 | 2.00 | .86 | .82 | 19.24 | 20.00<br>19.00<br>20.00 | 819<br>396<br>1346 |
| 9.39 | 8.00 | .17 | 9.56 | 9.00 | 2.35 | ...... | 2.35 | 1.00 | .47 | .41 | 15.68 | 16.50 | 637 |
| *6.59 | 7.00 | .37 | *6.96 | 8.00 | 7.03 | ...... | 7.03 | 7.00 | *.46 | .82 | 20.54 | .....<br>..... | 373<br>877 |
| 8.36 | 8.00 | .45 | 8.81 | 9.00 | 7.77 | ...... | *7.77 | 8.00 | 1.61 | 1.60 | 28.34 | 28.50<br>22.00 | 874<br>1345 |
| *6.58 | 7.00 | .99 | *7.57 | 8.00 | 4.27 | ...... | 4.27 | 4.00 | .81 | .82 | 19.54 | 22.00<br>21.00 | 820<br>1344 |
| 8.94 | 8.00 | 1.89 | 10.88 | 9.00 | 1.33 | 4.08 | *5.41 | 6.00 | 1.61 | 1.65 | 28.29 | 25.55 | 772 |
| *7.13 | 8.00 | 3.76 | 10.89 | 9.00 | 2.00 | .66 | 2.66 | 2.00 | .65 | .41 | 16.69 | 17.55 | 778 |
| 9.56 | 7.00 | 3.55 | 13.11 | 8.00 | 1.81 | ...... | 1.81 | 1.00 | .80 | .82 | 18.04 | ..... | 208 |
| 8.58 | 7.50 | 2.63 | 11.21 | 8.50 | .53 | 5.57 | *6.10 | 7.00 | *1.57 | 2.06 | 29.05 | 30.50 | 1115 |
| 8.38 | 8.00 | 1.40 | 9.78 | 9.00 | .66 | 3.71 | 4.37 | 4.00 | 1.18 | 1.23 | 24.44 | 22.50 | 1116 |
| *7.28 | 8 00 | 2.01 | 9.29 | 9.00 | 8.53 | .55 | *9.08 | 10.00 | *2.84 | 3.30 | 35.23 | 32.50 | 500 |
| 9.62 | 8.00 | .36 | 9.98 | 9.00 | 5.65 | ...... | 5.65 | 5.00 | *1.43 | 1.65 | 26.78 | 24.00 | 876 |
| 8.17 | 8.00 | .60 | *8.77 | 9.00 | 2.97 | ...... | 2.97 | 2.00 | 1.07 | .82 | 20.80 | 16.00<br>18.75 | 559<br>1071 |
| 8.66 | 8.00 | .66 | 9.32 | 9.00 | 6.11 | ...... | 6.11 | 6.00 | *1.27 | 1.65 | 25.40 | 23.00 | 1273 |
| 7.63 | 7.00 | .73 | 8.36 | 8.00 | 10.50 | ...... | 10.50 | 10.00 | 1.71 | 1.65 | 31.00 | .....<br>26.00 | 1256<br>1796 |
| *7.61 | 8.00 | .76 | *8.37 | 9.00 | 3.04 | ...... | 3.04 | 1.50 | 1.37 | 1.23 | 21.78 | 18.00 | 1272 |
| 8.32 | 8.00 | 1.26 | 9.58 | 9.00 | 3.59 | ...... | 3.59 | 3.00 | 1.66 | 1.65 | 24.72 | 25.50<br>24.00 | 1056<br>1331 |
| 7.81 | 8.00 | 1.73 | 9.54 | 9.00 | 4.06 | ...... | 4.06 | 4.00 | .85 | .82 | 21.20 | 22.00<br>21.00<br>19.00 | 232<br>138<br>292 |
| 8.56 | 8.00 | 1.05 | 9.61 | 9.00 | 10.52 | ...... | 10.52 | 10.00 | .85 | .82 | 28.22 | 26.00<br>24.00<br>23.00 | 518<br>291<br>779 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1455 | Lister's Pennsvlvania Special, | Frank P. Allen, Titusville, | 10.18 |
| 137 | †Lister's Potato Manure, | Wm. H. Schriver, Dillsburg, | 8.53 |
| 1410 | | D. W. Bortz, Greensburg, | |
| 586 | †Lister's Special 10% Potato Fertilizer, | T. H. Hoffman, Neffs, | 10.65 |
| 293 | | Uriah Daniel, Grats, | |
| 974 | | Sylvester Garr, Easton, | |
| 1103 | Lister's Special Tobacco Fertilizer, | J. Frank Lutz, Stevens, | 8.98 |
| 923 | †Lister's Success Fertilizer, | P. C. Harned, Edinboro, | 10.48 |
| 1058 | | Morrow & Buxton, Valencia, | |
| 1057 | Lister's 3-6-10 Potatoes, | Morrow & Buxton, Valencia, | 7.25 |
| 967 | †Lister's U. S. Super Phosphate, | Thos. Arndt, Danielsville, | 8.70 |
| 656 | | Daniel Lahr, Dornsipe, | |
| 1804 | | John Boyer, Klingerstown, | |
| | FREDERICK LUDLAM CO., BALTIMORE, MD. | | |
| 1297 | Ludlam's Cecrops Fertilizers, A. B. F. Brand. | W. H. Caller, Allen, | 10.53 |
| 1323 | †Luhlam's Cecrops Fertilizer, Harvest Queen. | Sechrist & Ihrig, York, | 9.30 |
| 1010 | | Wm. Albright, Cochranville, | |
| 1903 | | G. C. Miller, Ax Mann, | |
| 1309 | †Ludlam's Cecrops Fertilizers, No. 2 for Grain and Grass. | Jacob Fleisher, Marysville, | 8.75 |
| 1324 | | Sechrist & Ihrig, York, | |
| 1236 | †Ludlam's Cecrops Fertilizers, Potato and Tobacco. | A. A. Guss, Lewistown, | 8.96 |
| 1326 | | Sechrist & Ihrig, York, | |
| 1325 | †Ludham's Cecrops Fertilizers, Spring Special. | Sechrist & Ihrig, York, | 8.75 |
| 1011 | | Wm. Albright, Cochranville, | |
| 1902 | | G. C. Miller, Ax Mann, | |
| 157 | Ludlam's Cecrops Fertilizers, Standard, | Amos T. Bushey, York Springs, | 10.48 |
| 1308 | †Ludlam's Cecrops Fertilizers, Standard Potash. | Jacob Fleisher, Marysville, | 9.95 |
| 1327 | | Sechrist & Ihrig, York, | |
| | MAPES FORMULA AND PERUVIAN GUANO CO., THE, NEW YORK. | | |
| 1591 | †The Mapes Average Soil Complete Manure. | W. H. Muth & Co., Lititz, | 7.23 |
| 1704 | | Jacob Kech Sons, Kress, | |
| 988 | †The Mapes Economical Potato Manure, | H. S. Beidler, Doylestown, | 5.83 |
| 1589 | | W. H. Muth & Co., Lititz, | |
| 987 | †The Mapes General Crop Brand, | H. S. Beidler, Doylestown, | 5.13 |
| 1592 | | H. W. Muth & Co., Lititz, | |
| 46 | The Mapes Cereal Brand, | Hilles & Taggart, Norristown, | 6.90 |
| 39 | The Mapes Complete Manure for General Use. | Benj. Weidner, | 6.37 |
| 1240 | †Mapes Potato Manure, | A. F. Kimmell, Norristown, | 5.00 |
| 975 | | Hilles & Taggert, Norristown, | |
| 1674 | | Jno. Osterstock, Easton, | |
| 1590 | Mapes Tobacco Starter Improved, | W. H. Muth & Co., Lititz, | 6.73 |
| 1594 | Mapes Tobacco Manure (Wrapper Brand), | W. H. Muth & Co., Lititz, | 4.80 |
| 446 | †Mapes Top Dresser, Improved, Full Strength. | Hilles & Taggart, Norristown, | 6.00 |
| 1241 | | A. F. Kimmel, Orwigsburg, | |
| 1593 | Mapes Top Dresser, Improved, Half Strength. | W. H. Muth & Co., Lititz, | 7.20 |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | | |
| 1587 | Martin's Bull Head Fertilizer for Cotton and Tobacco. | J. T. Fisher, Lancaster, R. D. 6 | 9.93 |
| 802 | Martin's Corn and Cereal Special, | Chas. Zeller, Lewisburg, | 9.30 |
| 347 | †Martin's Gilt Edge Potato Manure, | J. H. Griegrich, Hershey, | 9.33 |
| 1991 | | Lanc. Co. Farmers' Asso., Manheim, | |
| 780 | †Martin's One, Eight and Four, | Frank Rhule, Mifflinburg, | 11.80 |
| 462 | | Ed. Houck, Bangor, | |
| 1242 | | A. F. Kimmel, Orwigsburg, | |
| 283 | †Martin's Prize Potato, | David Reigel, Jonestown, | 9.98 |
| 193 | | T. J. Novinger, Lewistown, | |
| 490 | | Passmore & Co., Nottingham, | |
| 401 | †Martin's Special Compound, | Passmore & Co., Nottingham, | 10.20 |
| 346 | | J. H. Gingrich, Hershey, | |
| 543 | | Amandus Weating, Schneidersville, | |
| 282 | †Martin's Potato Manure, | David Reigel, Jonestown, | 11.05 |
| 140 | | Cook & Co., Dillsburg, | |
| 461 | | Ed. Houck, Bangor, | |
| 463 | Martin's Sure Grower, | Ed Houck, Bangor, | 8.98 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 7.88 | 8.00 | 1.35 | 9.23 | 9.00 | 5.80 | ...... | 5.80 | 5.00 | 1.29 | .82 | 24.44 | 24.00 | 1455 |
| *7.39 | 8.00 | 2.18 | 9.57 | 9.00 | 8.17 | ...... | 8.17 | 7.00 | 3.64 | 3.29 | 37.94 | 35.00<br>40.00 | 137<br>1440 |
| 7.82 | 8.00 | 2.17 | 9.99 | 9.00 | 9.33 | 1.79 | 11.12 | 10.00 | 1.61 | 1.65 | 32.49 | .....<br>26.50<br>..... | 586<br>293<br>974 |
| 9.64 | 8.00 | 1.15 | 10.79 | 9.00 | 4.45 | ...... | 4.45 | 3.00 | 2.29 | 2.06 | 29.82 | 26.00 | 1103 |
| 8.84 | 9.00 | 1.38 | 10.22 | 10.00 | 2.35 | ...... | 2.35 | 2.00 | 1.36 | 1.23 | 22.63 | 22.00<br>24.50 | 828<br>1058 |
| 6.59 | 6.00 | .64 | 7.23 | 7.00 | 9.99 | ...... | 9.99 | 10.00 | *2.15 | 2.47 | 31.45 | 34.00 | 1057 |
| 8.94 | 8.00 | 1.02 | 9.96 | 9.00 | 2.48 | ...... | 2.48 | 2.00 | 1.07 | 1.03 | 21.36 | .....<br>20.50<br>19.00 | 656<br>967<br>1804 |
| 8.59 | 8.00 | 1.21 | 9.80 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.63 | 1.65 | 23.56 | ..... | 1297 |
| 8.54 | 8.00 | 1.28 | 9.82 | 9.00 | 2.46 | ...... | 2.46 | 2.00 | .81 | .82 | 19.87 | 18.65<br>21.00<br>20.00 | 1323<br>1010<br>1903 |
| 7.55 | 7.00 | 1.25 | 8.80 | 8.00 | 1.57 | ...... | 1.57 | 1.00 | .87 | .82 | 18.16 | .....<br>17.40 | 1309<br>1324 |
| 8.08 | 8.00 | 1.75 | 9.83 | 9.00 | 10.00 | ...... | 10.00 | 10.00 | 1.46 | 1.65 | 30.82 | 28.00<br>27.70 | 1236<br>1326 |
| 9.38 | 9.00 | 1.05 | 10.43 | 10.00 | 7.96 | ...... | 7.96 | 7.00 | .81 | .82 | 26.25 | 22.80<br>25.00<br>24.00 | 1325<br>1011<br>1902 |
| 8.18 | 8.00 | 1.47 | 9.65 | 9.00 | 5.67 | ...... | 5.67 | 5.00 | 1.90 | 1.65 | 27.88 | 22.00 | 157 |
| 8.61 | 8.00 | 1.31 | 9.92 | 9.00 | 3.94 | ...... | 3.94 | 4.00 | .78 | .82 | 21.48 | .....<br>20.10 | 1308<br>1327 |
| 7.17 | 7.00 | 2.13 | 9.30 | ...... | 1.20 | 4.60 | 5.80 | 5.00 | 4.06 | 4.12 | 38.22 | 37.00<br>36.00 | 1591<br>1704 |
| *3.60 | 4.00 | 3.15 | 6.75 | 6.00 | 1.46 | 7.97 | 9.43 | 8.00 | 3.28 | 3.29 | 36.19 | 37.00<br>37.00 | 988<br>1589 |
| *6.90 | 8.00 | 2.98 | 9.88 | 10.00 | 2.78 | ...... | 2.78 | 2.00 | 1.80 | 1.65 | 23.95 | 28.00<br>24.00 | 987<br>1592 |
| 6.49 | 6.00 | 2.13 | 8.62 | 8.00 | 2.53 | .96 | 3.49 | 3.00 | 1.76 | 1.65 | 23.83 | 30.00 | 46 |
| 9.53 | 8.00 | 2.07 | 11.60 | 10.00 | 4.13 | .55 | 4.68 | 4.00 | 3.66 | 3.29 | 36.70 | ..... | 89 |
| *7.30 | 8.00 | 2.51 | 9.81 | 9.00 | 1.33 | 6.46 | 7.79 | 6.00 | 3.71 | 3.71 | 39.43 | 40.00<br>42.00<br>35.00 | 1240<br>975<br>1624 |
| 7.24 | 6.00 | 1.56 | 8.80 | 8.00 | 1.20 | 1.09 | 2.29 | 1.00 | 4.06 | 4.12 | 33.62 | 37.00 | 1590 |
| 2.71 | ...... | 2.68 | 5.39 | 4.50 | 5.46 | 4.90 | 10.36 | 10.50 | 6.24 | 6.18 | 48.69 | 49.00 | 1594 |
| 5.97 | 5.00 | 2.86 | 8.83 | 8.00 | .80 | 4.23 | 5.03 | 4.00 | *9.21 | 9.88 | 60.01 | 58.00<br>53.00 | 446<br>1241 |
| 2.83 | 2.50 | 2.04 | 4.87 | 4.00 | .53 | 1.90 | 2.43 | 2.00 | *4.73 | 4.94 | 32.89 | 31.00 | 1593 |
| 9.65 | 8.00 | 1.84 | 10.09 | ...... | 3.84 | ...... | 3.84 | 3.00 | 2.38 | 2.47 | 32.04 | 24.00 | 1587 |
| 8.55 | 8.00 | 2.45 | 11.00 | ...... | 3.30 | ...... | 3.30 | 2.00 | 1.64 | 1.65 | 25.20 | ..... | 802 |
| 7.18 | 7.00 | 1.90 | 9.08 | ...... | 10.73 | ...... | 10.73 | 10.00 | 2.36 | 2.47 | 34.34 | 28.50<br>28.00 | 347<br>1991 |
| 8.59 | 8.00 | 1.11 | 9.70 | ...... | 4.72 | ...... | 4.72 | 4.00 | .98 | .82 | 23.06 | .....<br>20.00<br>18.00 | 780<br>462<br>1242 |
| 7.93 | 8.00 | 1.91 | 9.84 | ...... | 9.33 | 1.33 | 10.66 | 10.00 | 1.64 | 1.65 | 32.13 | 26.00<br>28.00<br>27.00 | 283<br>193<br>400 |
| 8.07 | 8.00 | 3.24 | 11.31 | ...... | 5.40 | ...... | 5.40 | 5.00 | 1.65 | 1.65 | 27.20 | 24.00<br>22.00<br>23.00 | 401<br>346<br>542 |
| 8.80 | 8.00 | 1.17 | 9.97 | ...... | 5.32 | ...... | 5.32 | 5.00 | .85 | .82 | 23.22 | 18.50<br>19.25<br>21.00 | 282<br>149<br>461 |
| 8.26 | 8.00 | 1.21 | 9.47 | ...... | 1.47 | ...... | 1.47 | 1.00 | 1.03 | .82 | 19.65 | 17.00 | 463 |

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*Constituent falls below guaranty

| County. | Name and Address of Chairmen. |
|---|---|
| ercer, | Wm. C. Black, Mercer. |
| ifflin, | M. M. Naginey, Milroy. |
| onroe, | F. S. Brong, Saylorsburg. |
| ontgomery, | J. H. Schultz, 506 Hamilton St., Norristown. |
| rthampton, | C. S. Messinger, Tatamy. |
| ontour, | J. Miles Derr, Milton, R. D. No. 1. |
| orthumberland, | I. A. Eschbach, Milton, R. D. No. 1. |
| hiladelphia, | S. K. Foster, Torresdale. |
| rry, | C. M. Bower, Blain. |
| ke, | B. F. Killam, Paupack. |
| tter, | A. T. Crittenden, Oswago. |
| huylkill, | John Shoener, New Ringgold. |
| yder, | F. F. Glass, Freeburg. |
| merset, | J. C. Weller, Rockwood. |
| llivan, | E. R. Warburton, Campbellsville. |
| squehanna, | F. A. Davies, Montrose. |
| oga, | C. H. DeWitt, Mansfield. |
| nion, | J. Newton Glover, Vicksburg. |
| nango, | W. A. Crawford, Cooperstown. |
| arren, | G. A. Woodside, Sugargrove. |
| ashington, | D. S. Taylor, Burgettstown. |
| ayne, | W. E. Perham, Pleasant Mount. |
| estmoreland, | W. F. Holtzer, Greensburg. |
| yoming, | George A. Benson, Tunkhannock. |
| rk, | G. F. Barnes, Rossville. |

## E LECTURERS FOR SEASON OF 1912-13

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Troy, Pa., R. D. No. 66.
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Allentown, Pa.
ove, Pa.
College, Pa.

## FARMERS' ANNUAL NORMAL INSTITUTE

### PROGRAM.

First Session Convenes Tuesday Afternoon, May 20, 1913.

MR. D. S. TAYLOR, Burgettstown, Pa., Chairman.

Call to order 1.30.

Addresses of Welcome, W. W. Hoyt, Burgess, Washington, Pa.
T. Jeff Duncan, Esq., Washington, Pa.
R. S. Rankin, Master, Pomona Grange, Hickory, Pa.

Response, by Hon. N. B. Critchfield, Secretary of Agriculture. Harrisburg, Pa.
Prof. Franklin Menges, York, Pa.

1 "THE FUNCTION OF THE EXPERIMENT FARMS."
Dr. Chas. E. Thorne, Director of Ohio Experiment Station, Wooster, Ohio.

Tuesday Evening, May 20, 1913.

### WOMENS' SESSION.

MRS. MARTHA E. MARTIN, Harrisburg, Pa., President.

Call to order 7.30.

1. "THE FARM HOUSE."
Mrs. Mary T. Monroe, Dryden, N. Y.

2. "THE COUNTRY BOY."
Dr. A. Holmes, Dean of the General Faculty, State College, State College, Pa.

3. "HOME MAKING A SCIENCE."
Dr. Hannah McK. Lyons, Ceres, Pennsylvania State Grange, Lincoln University, Pa.

4. "WOMEN'S SHARE IN THE FARM PARTNERSHIP."
Mrs. H. B. Fullerton, Milford, Long Island, N. Y.

### Wednesday Morning, May 21, 1913

N T. SMITH, Dunbar, Pa., Chairman.

BREEDING OF THE DAIRY HERD.”
R. J. Weld, Sugargrove, Pa .

SANITARY MILK PRODUCTION.”
Dr. Louis A. Klein, Dean School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

E CONSIDERED AS THE BASE OF SUPPORT OF

Dr. John W. Adams, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

### Wednesday Afternoon, May 21, 1913.

W. STEWART, Jefferson, Pa., Chairman.

RAL PRESS AND THE FARMER.”
Arthur J. Anderson, Editor, The Pennsylvania Farmer, Philadelphia, Pa.

IP OF THE FARM.”
H. W. Collingwood, Editor, The Rural New Yorker, New York City.

ROLLING SOIL FERTILITY.”
W. D. Zinn, Phillippi, W. Va.

### Wednesday Evening, May 21, 1913.

. GEORGE, West Lebanon, Pa., Chairman.

IN THE DISTRIBUTION AND SALE OF FARM
ND THE PURCHASE OF FARM SUPPLIES.”
E. B. Dorsett, Mansfield, Pa.

Prof. F. R. Stevens, Agriculturist.

TURAL OPPORTUNITIES ARE IN THE EAST.”

H. B. Fullerton, Director Agricultural Development, Milford, Long Island, N. Y.

Thursday Morning, May 22, 1913.

## GOOD ROADS SESSION.

MR. GEO. G. HUTCHISON, Warriors Mark, Pa., Chairman.

Call to order 9.30.

Opened by Hon. John K. Tener, Governor of Pennsylvania, Harrisburg, Pa.

Hon. Jonathan Bourne, Jr., Chairman, Joint Committee on Federal Aid in the Construction of Post Roads, Washington, D. C., is expected to address this meeting.

Hon. Boies Penrose, Representing Joint Committee on Federal Aid in the Construction of Post Roads, Philadelphia, Pa.

1. "ROAD CONSTRUCTION."
   Hon. Edward M. Bigelow, State Highway Commissioner, Harrisburg, Pa.
2. "IMPORTANCE OF DIRT ROAD BUILDING."
   Hon. Edward E. Jones, Hartford, Pa.

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Thursday Afternoon, May 22, 1913.

## FARMERS' INSTITUTE SESSION.

HON. A. L. MARTIN, Director, Harrisburg, Pa., Chairman.

Call to order 1.30.

1. "A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS."
   Messrs. R. P. Kester, Grampian, Pa.
   J. T. Campbell, Hartstown, Pa.
   Franklin Menges, York, Pa.
   L. W. Lighty, East Berlin, Pa.
   D. H. Watts, Kerrmoor, Pa.
2. "THE FARMERS' INSTITUTE, FROM COUNTY CHAIRMEN'S POINT OF VIEW."
   a "County Organization of Institute Committee."
   Hon. H. G. McGowan ,Geiger's Mills, Pa.
   b "Responsibilities of County Chairmen."
   P. S. Fenstermaker, Allentown, Pa.
   c "Advertising; How Best Conducted."
   G. F. Barnes, Rossville, Pa.
   d "Preparing Programs; When and How."
   W. F. Biddle, Everett, Pa.
   e "Local Institute Expenses."
   J. E. Hildebrant, Dallas, Pa.
   f "Should County Chairmen Attend all Their Institutes."
   J. H. Schultz, Norristown, Pa.
   g "Which is Preferable ,Written or Oral Questions."
   J. Newton Glover, Vicksburg, Pa.

GENERAL DISCUSSION.

Thursday Evening, May 22, 1913.

. **PURDY**, Imperial, Pa., Chairman.

NIA POULTRY HOUSES, GOOD AND BAD."

W. Theo. Wittman, Allentown, Pa.

IVE TYPE OF AGRICULTURE."

Prof. R. L. Watts, Dean, Experiment Station, State College, Pa.

ITY OF OUR FRUITS."

Prof. H. A. Surface, Economic Zoologist, Department of Agriculture, Harrisburg, Pa.

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Friday Morning, May 23, 1913.

F. BIDDLE, Everett, Pa., Chairman.

OLUTION COMMITTEE."

journment.

# PROCEEDINGS OF THE FARMERS' ANNUAL NORMAL INSTITUTE, HELD AT WASHINGTON, PA., MAY 20-23, 1913.

Washington, Pa., May 20, 1913, 1.30 P. M.

Mr. D. S. Taylor in the Chair.

The CHAIRMAN: Gentlemen: The hour set for the opening of our exercises has come and gone. We were detained a little while outside to have our pictures taken, but we are glad to see so many of you present at the opening session of the Normal Institute. We will not spend any time talking, as there are other people here better qualified to address you than I am, and I will proceed with the program. The first address of welcome is by Mr. W. W. Hoyt, Burgess of Washington. I have the pleasure of introducing Mr. Hoyt.

Mr. Hoyt spoke as follows:

## ADDRESS OF WELCOME

By MR. W. W. HOYT, *Burgess of Washington, Pa.*

Mr. Chairman and Gentlemen of the Farmers' Normal Institute: It is my pleasant and honorable duty, in behalf of our local committee and our citizens this afternoon, to extend to you a brief and formal word of welcome in the name of that great and illustrious patriot, the one to whom every true patriotic American lifts his hat in reverence and honor, even the name of that first of all American citizens, WASHINGTON. It is an honor, which I do not appreciate lightly, I assure you, to stand here in behalf of our local committee and of the citizens of Washington to extend to you a most cordial welcome to our city. I also welcome you as a body of conscientious gentlemen, gathered here from Pensylvania, representing many sections of our glorious old Keystone State. I shall not attempt to dwell at length upon the vast amount of good that has been done by the State Board of Agriculture and by your various local organizations throughout the Commonwealth, a benefit not only to yourselves and the agriculturists, but a measureless benefit to our State, our entire nation, and the world at large. I feel that I would be remiss in a plain duty were I not to publicly speak of the work of preparation which has been done by the members of your local committee, and if your arrangements are complete, if your stay here during these few days shall prove pleasant and profitable to you, if, when you go away, you shall have a warm heart and a warm place in your affections for the City of Washington, it will be because the members of your local committee have done their duty as good citizens and as loyal members of your organization. I thank you for the kind reception you have ten-

**oon, and, as a representative of our people and u success and God-speed in your undertakings on, I again bid you welcome, thrice welcome to**

**The next address will be by Mr. T. J. Duncan, ave the pleasure of introducing Mr. Duncan, an f Washington, Pa.**

**e as follows:** .

## ADDRESS OF WELCOME

3y T. J. DUNCAN, Esq., *Washington, Pa.*

id Gentlemen of the Association: If you will in-nutes, I will then turn you over to the mercy of are on the program and who will probably have f more interest, and, possibly, of more substantial elf will be able to present.

, which I presume everybody concedes, that there lition without a precedent cause; everything that s is the result of something that has preceded it. to-day, the people of this world who are living at ely either suffering or enjoying the consequences ne history of to-day, when read in the future, will ical consequences of something that preceded it. l in almost everybody's every-day life. Even our e producing and pre-existent cause; it may be an ch; it may be a nervous condition or it may be a ce, but as sure as the thing exists to-day, it is ng or some power that has gone before.

there is a reason why I should be here, and briefly gest to you some of those reasons. The universality erybody having something in mind to which they e, is illustrated by an incident that occurred in city of Pittsburg during one of the expostions there ), of which a musical program was a part. On the woman in her best attire, and beside her the man r and the baton which he was swinging and beating ms as she proceeded with her music. In the audience had with her her little son of five or six years. The the program progressed, in boyhood ways, climbed id surveyed all that was around him, then got down nd inspected everything beneath. The woman grew lled him up and set him down on the seat beside n to be quiet. For a moment he looked and listened Mamma, what is that man trying to hit that woman ?" He realized that all that effort had some purpose woman replied, "He is not hitting her." "Well then," 'What is she hollering so about." Now then, there are causes why, as I said, I should be here, and the first perhaps a sufficient reason is that I notice on the program which I hold in my hand that there are to be responses.

Now if there were no preliminary addresses of welcome or expressions of appreciation or something of that nature, what would become of all these responses you are to listen to, which are the real and important feature of this part of your program. If Mr. Hoyt, or myself, or the gentleman who is to follow us in congratulations to you, failed to be here, what would become of the address of your Secretary of Agriculture, which will be full of meat and instruction. And care and a due regard for him requires that we should say something that will be introductory and give him an opportunity and his co-laborer who is to respond in behalf of the Grange, an opportunity to say something.

I would not want him or you, he not having anything to respond to and you not having therefore anything to listen to, to give me, as having failed to come here, such an answer as the young man reported the girl gave him when he asked her if she'd marry him. I can give it better in his own language than anything I could formulate myself, he told it in this way afterwards, when it was over. "I asked a maiden fair, with bright golden hair, if me she would wed. With a gentle smile and a twinkle in her eye, 'See father' she said. Now she knew that I knew her father was dead. She knew that I knew the wild life he had led. Therefore she knew well that I could tell where she meant, when she said, 'Go see father.'"

I want however, before closing to introduce you to Washington county. You are here in our midst, and we are glad to receive you, and I was directed by the committee who brought me to this position —well now, in fact I am like the man was when he had just been married and the guests were gathered around and the wedding feast was on; somebody conceived the notion that there should be some addresses and that the groom should tell what he thought of the occasion, and what he had to say of his expected future life. The time came; he was called upon; he was surprised and embarrassed, and he rose up and unconsciously he put his hand on the bride's shoulder. "Now," he said, "since this thing has been forced on me, I will have to do the best I can." Washington county ought to be, to a Washington countian, like every man's watch and his wife, the best of the kind in the country, and we people who are residents here are apt to entertain that feeling about the locality to which you have come, for which we have no apology to make, because we have within us good reasons for the faith that we entertain and of which we would like you to be as well convinced before your stay with us, toward the close of this week, is ended.

Located as we are, here in the southwestern part of Pennsylvania, bounded by Allegheny and Westmoreland and Greene and Beaver counties, and by the West Virginia State line, we have an area of about 889 square miles, which, located as we are at the foothills of the Allegheny Mountains, consists of beautiful valleys and hill-tops which we think, for natural beauty and substantial qualities, is unsurpassed within the limits, not only of Pennsylvania, but of the entire National domain. In population, we have a little over

143,000 people. In soil, we have what is known as limestone clay, and a rich loam in other sections which is as productive, almost as it is possible to conceive, that the earth anywhere contains. It produces fields of grain of every conceivable kind adapted to the Temperate Zone, and our cattle are scattered abroad throughout the limits of the county over a thousand hills, of all varieties, of good quality and of profitable production to its owners.

We have also a peculiar product in this section of the State, that of petroleum oil, which sends its illuminating influence throughout the entire world. There is nowhere in modern civilization that this production does not go to enlighten the dark hours of the people who depend upon it for artificial light. Washington county not only furnishes this as an illuminating power but it goes to lubricate the machinery of the world and its by-product to produce many effects and beneficial results which it is impossible in the limited time I have here to even suggest. We have a coal area that is unprecedented. There is scarcely a farm in Washington county which is not underlaid with that rich vein of bituminous coal known as the Pittsburg or River formation which has no superior in the production of steam and coke, and of the other things which follow as a by-product of its manufacture. There is nowhere that I know of within transportation limits, that this coal does not command a higher price than any other coal that is produced in this nation that is to be used for the same purpose. Similar coal exists in two or three of the surrounding counties, but it is limited to this region of the State, and we alone, with our two or three neighboring counties, have the monopoly of the coal of this kind and of this quality.

We have, in financial affairs, a state or condition which we think is almost unequaled, and I do not believe is anywhere surpassed within the limits of our nationality. There are in this county, within the territory or boundary of this county, 41 financial institutions, with a combined resource of over $36,000,000. Dividing that by the population, it shows this remarkable condition, and I mention it because it is necessary, in some way, to manifest what the condition is here and what the relation of our people is to these institutions. Dividing it by the population of the county, we have a result of two hundred and forty-some dollars to every individual resident within the boundary of Washington county; or taking the usual estimate that the voter is one-sixth of the population, we have invested in these institutions in some form or other, an average of nearly $1,458. to every adult male citizen or resident that we can enumerate as a part of our population. Now, those figures may not seem large at first blush, but when you think that that is only a fraction of the investment and worth of this county, when you realize that it represents the savings that is put in that particular channel, I don't believe, gentlemen, that when one of you go home, if you will take the opportunity to look at it in the same way, that you will find it not surpassed anywhere within the limits of Pennsylvania. Where there are large populations, where there are more densely populated cities, where there is a larger concentration of wealth, the relation of amount to numbers I think will bring out averages that are away beneath this that we have here.

Let me repeat, that I am presenting this not as evidence of the wealth of the people, but as a suggestion to you of the drift that a portion of that money takes and the large interests that they have in saving, and in financial institutions that indicates a business condition that prevails in comparatively few localities.

These are a few of the things to which I desire to introduce you to-day. The county is spread out; it is for your investigation and we sincerely hope that before your adjournment, as many of you will see as much of its fields, its hills, its woods, its grain, its cattle, as the opportunity allows you to do, considering your obligation to the association here. Now I know that it is impossible to do that, but I could only suggest to enable you to do it in part, at least, the advice that was received by the gentleman who answered an advertisement in a newspaper which, in some educational concern ostensibly advertised that, for a specific fee, they would instruct anybody how they could learn the French language in twenty-four hours. The fee was sent, the answer came and he read in his instructions: "Divide the language into twenty-four parts and learn one part each hour." If you can divide the county into sections amongst yourselves and visit it, you can see as much as possible of it and then communicate with each other the results of your observation.

There is another reason why we want to welcome you to our community, and that is on account of yourselves as individuals and on account of the cause that you represent. This community is always glad to receive into its limits men who represent worthy enterprises, who have honorable purposes in view and who are intelligent enough to bring us something for ourselves from which we may receive benefits and liberal enough to take from us anything they can find amongst us that may be of benefit to themselves. Such being the situation, I do not need to remind this gathering that the interests of agriculture stand pre-eminently above any other interest or enterprise known to human kind. In age, it is venerable. In both sacred and secular history, it is the oldest employment in which the human race was ever engaged, and as time has moved on, it has stood paramount in importance, ahead in usefulness and most marked and distinguished in its character and its results to mankind. The artist in color and stone may boast of the beauty of his productions as they adorn the public places or the walls of exhibitions; the architect may be proud of the products of his profession as they tower toward the clouds and as they accommodate the throngs of human kind, but all things dwindle into insignificance when you consider the results of the agriculturist and his contribution to the welfare of his race. The one plays merely for the entertainment of the people, supplies the desires or the suggestions merely of man's artistic nature of his less urgent physical necessities, but the agriculturist contributes to the absolute needs of every member of the human race and outweighs in importance and overcomes in value and surpasses in its real merit every other enterprise of which we have any knowledge. The representatives of such an enterprise are entitled to a welcome in any community which they visit and we desire to make you welcome to the confines of Washington county.

Now it is not always ability to appreciate our own strength or our own forces without taking a little stock sometimes of what we have in our business enterprises, and the manufacturing and commercial world do this at regular intervals. I don't know whether all of you have thought of what I am about to suggest yourselves, or not; nor do I know whether, in the past, you have thought of the full force and effect of this investigation when it is once made. The report of the United States census for 1910 gives us the information that the total population of this whole country is in round numbers about 93,000,000 people, and more detailed returns, if the published statements that I have recently received are correct, reveal the fact that of that number, 51,000,000 are what is known as a rural or agricultural population, which includes villages less than of 1,000 people, where the interests of the residents are common with those who occupy the farm and cultivate the soil. Now think of it a minute.

What does that mean? It means not that the farmer and the agriculturist represent more in numbers, more in value and more in power than any other interest, but it means that they are a majority of the whole, and hold in their hands the power and the strength and the control of this great nation. If there were an array in which the agricultural interests were represented on the one side and some antagonistic matter on the other, it is in the power of the farmers of this nation to control the election, to name its officers and determine who shall administer its affairs. Taking the same basis that I had a while ago in the estimate of the investment in this county per individual and citizen, those figures mean that in an array wherein there were antagonistic interests, if that were possible in a country where we all have so many common interests, it means that there is a clear voting majority in the hands of the agricultural population of the United States of about one million people, and that they have, therefore, the power, if they were arrayed together on one side, and all the rest of the people on the other, that they could march triumphantly to the accomplishment of any purpose they had in view. Let me ask you now, let me speak to you interrogatively, have the interests of the agricultural portion of the community received the consideration that their numbers deserve, in the legislation, in the distribution of public means, in the halls of Congress? I say have they received the attention that they really deserve on account of their numbers, the importance of their occupation and the respectability of those engaged in it? If not, why? Now why? This necessarily leads ——

A Member: Because they don't stand together.

MR. DUNCAN: A brother here suggests that it is because they don't stand together; or as it occurs to me and suggests itself to every man in this hall, it is the question of organization and cooperation. The old Grecian phalanx, the old Roman legions under Caesar, the hollow squares of Napoleon in his campaign in Egypt and some of his other battle-fields, demonstrated most effectively the power of complete organization against that which was less complete organized and operated. In all those instances, comparatively small bodies of men and soldiers overcame the disorganized groups, and throngs of those against whom they contested and victory perched upon the banners of smaller numbers because of complete and systematic organization and control by those who had charge of the affairs. It is just as true to-day in the affairs of this life in this country as it is elsewhere or as it is in these things that we have. A few men organized and operated properly in the form of police will disperse a mob of men ten times or a hundred times their own number in a few moments' time.

Now we come to organization. The agricultural interests have some things that are peculiarly their own. I don't mean that they are necessarily in conflict with the needs or the interests or any matters in which other people are concerned, because what is for their good in some sense subserves the welfare of the entire population, but that their interests may be advanced, there are times when certain things are peculiar to themselves, and the only way that that interest can be protected and its welfare advanced is for those who are concerned in it to co-operate together. Now, there are organizations in this country that will illustrate what I am referring to here. Railroad engineers have the Brotherhood; railroad firemen have their association, as have also the brakemen. Miners have their Trades Unions in the various sections of the country. Manufacturers of iron and steel and glass and other things are bound together by agreements and combinations which mean that when they move, they move as an organized body, and when Mr. Gompers or Mr. Mitchell or Judge Gary appear in public or before committees and demand or plead for some cause, some specific enactment, the hearers pay them respectful attention because they know that they are backed by a solid phalanx, bound together, which, if results are not produced, will show in the election that is to come in the future.

Now another question, What is politics? I have no doubt that you come here and that you and I and all who are present represent different so-called political organizations; but what is politics? It is simply something that subserves the interests of the individual. Would you, my brother, sustain and co-operate with any proclaimed party organization with a consciousness on your part that it was perhaps to ruin your welfare or destroy your happiness or reduce your weath? You answer that for yourselves. By different courses of reasoning, we sometimes arrive at different conclusions, but is not politics merely the effort on the part of each individual, to accomplish something for his own good and at the same time the good of his neighbors and associates? What then, is the impropriety in suggesting that the farmers, the agriculturists of the country should, so far as they have a common interest, have a means of making that common interest known and demand that it be respected by those who assume to take political place? They can do it, and when they are properly organized, they will do it, and it is coming to that that I want to speak a moment before I close.

I don't know any process or means in existence at this time by which that can be fully carried out except the one organization, the Patrons of Husbandry, commonly known in its local societies as the Grange. I suggest this because, those of you who are identified with it, know its workings and its purposes, will listen patiently to what I have to say. To those of you gentlemen who are not familiar with its organization, who, in your own communities, have stood aloof, I would desire to recommend an investigation, so that, wherever they exist, they will have the moral and the physical support of the men who are a part of their communities and who ought to co-operate with them. The purposes of this organization are set forth in many books and publications, and amongst them the leading one is opposition to Corporate Monopoly.

Now, I haven't time to stop and discuss that. There is not an intelligent man here who is not able to realize and who probably has not more than once felt and reasoned within himself about the great accumulation of wealth in a few limited hands until this country is in danger of supporting what is known as a monopolistic aristocracy as contrasted with the general population, and which will be as effective and as oppressive to our people as the old-fashioned aristocracy of the European monarchies in the countries from which our ancestors fled. There, it was class against class. We, in this free country, are producing a situation by which the aristocratic feeling will be brought to be as oppressive, if not checked in some way, as from which our ancestors, as I say, sought refuge. It is in the hands of the agriculturists of this country to make it, in that respect, what it should be, and produce an equality of our products and our good things amongst the people. Time forbids a further discussion of that; I can only mention it.

Another thing is announced as one of the purposes of the Grange organization, namely, to avoid railroad discriminations. I will not undertake to discuss that now: To secure co-operative dealing; to produce a higher standard of social life, in which I believe the spirit is, to some extent, an acknowledgment of the equality of the sexes in rights as well as intelligence and influence. It is intended to promote a government of the nation by the people, and when these things are accomplished, together with its other objects, the farmer and the agriculturist will stand higher and be entrenched in a stronger position than he has ever been in the past.

Now, can these things be accomplished. Think a moment what has been accomplished. You know it has been said one of our Revolutionary heroes, that there was but one way of judging of the future, and that was by the past. We know only what we may do by seeing what has been done, knowing that equally great results will follow. The Grangers have been in existence but about thirty or forty years; organized in Washnigton City by Father Kelly, first effective in the State of Iowa and have since been fighting, with more or less vigor, the fight for the supremacy of the principles of the Grange.

What have been the fruits of that battle? All over this country, you will find schools or colleges for agricultural purposes, or universities with agricultural departments in them and Experiment Stations in nearly all the states of the Union. Did those things come of themselves? They are the result of a persistent and aggressive agitation whereby the people who had control of these things realized certain rights and gratified them to that extent. Are they what they ought to be? Does the Commonwealth in which we live to-day do justice to agriculture in the institutions which it supports, in part or in whole, in the same amount or to the same extent that it is doing for other enterprises? Why have they been made—have our legislators been made to feel that if they did not, there would be a change in those who administered the affairs of the government?

Another matter that is the result of agricultural or Grange agitation, is, what is commonly known as the Interstate Commerce Commission. Now, this is one of the broadest, most effective and beneficient pieces of legislation that has passed any legislative body within a generation. It has not taken the phase exactly of partisan politics, but it is the result of the agitation which began against discrimination in Iowa, that was felt elsewhere over the country and by the constant aggression of what little organization existed among agriculturists, the nation was brought to realize the injustice of the condition against which it was fighting and this result was brought about. It is not yet perfect, but it is marching onward toward a state of greater perfection and will become more useful year to year. Its powers are great; its officers seem to be, as a rule, independent and make an effort to be just, and many of the evils it has already obliterated have ameliorated the condition of shippers of grain and fruit in common with those in other parts of the country.

Another result attributable almost directly to the Grange efforts and the enlightenment it gave the country, is the rural delivery system. Everybody knows the conveniences of that arrangement, and that was followed by the Parcel Post. If the Granges had been able first by such united efforts as they could make, which are lame because they are not as largely patronized as they should be, but if they had been able to enlighten the public and bring about these results, what can they do in the future if all the people who are interested in the enterprises in which they are engaged, were to unite and co-operate with them? I say that in the future they have a right to expect to accomplish the acknowledgment and recognition of the things they represent and the things that their welfare demands.

Now, gentlemen, I fear that I have talked a little longer than I intended, but I will close with this suggestion, that in this day we are feeling a condition that we ought not. The march is onward. The people are restless. There was a demonstration in two recent conventions in this country, one at Chicago and the other at Baltimore, that demonstrated that the people were determined to have their way about things. It spread all over the world. Witness the recent governmental revolutions in Persia, the overthrow of the hoary aged dynasty in China, and nearer home, the marked denunciation and overthrow of the restrictive power of the House of Lords in England, whereby the people demanded and compelled the other side, or the aristocratic feeling, to yield to their demands and their necessities.

The same thing is taking place in this country. There is a demand on the part of the public toward democratic or popular management and administration of the affairs, and if the people will persist, that will be brought about. In our nation, two important steps have recently been taken, the authorization of an income tax by a majority of the states of this nation, and the recent announcement that the election of United States Senators is hereafter to be made by the people and not by a selected few. There is now pending in Harrisburg a bill in which we ought all to be interested, known as the Utilities Bill, in three forms, existing there, and it should receive the attention of the people to make their feelings on that subject known to their representatives, that great good may be accomplished by the enactment of proper legislation in that particular. The agricultural men can aid if they want to. They will, by organization such as I have suggested here, and by thorough support of the Society that was within their own limits and convenience, produce and accomplish the good legislation to which they are entitled.

Now, I have ventured to introduce the community into which you come. I have possibly gone a little further than I intended to in suggesting the things for your consideration and interest. Carry home the thought, if I have given you any that is good. If I have made utterances that are not right, dismiss them and excuse me for a misjudgment, and I trust that with this condition, I have not said anything that is offensive and that some good may come of the subject that I have suggested, as well as the other benefits upon which you shall deliberate during your visit here.

The CHAIRMAN: We will further be addressed along the line of welcome to the county of Washington by our young farmer friend, R. S. Rankin. I have the pleasure of introducing to you Mr. Rankin.

Mr. Rankin spoke as follows:

## ADDRESS OF WELCOME

By R. S. RANKIN, *Washington, Pa.*

Mr. Chairman, Board of Agriculture and Friends: In behalf of the farmers of Washington county, and in the name of the Grange, I certainly welcome you into our midst. To go on and tell you the good that Washington county is or how we believe in Washington county—my predecessor has told you; but I will tell you this, that we are all proud of our county. I am reminded of the little saying, that when a man can't make a living in Washington county, he'd better just die, because he can't make a living any place else. You have been told of our coal and oil, you have been told of all the natural advantages that you will find in this county, if you will find them anywhere. If you want anything to burn, you can burn anything at all. We have got coal and oil and gas and wood, so you can just take your choice. And as to water, we have it right out of the ground; you don't have to pump it even, and all these things I want you men to see while you are here. We welcome you into our county, because we know that you are a body of men working for our interests. You are all honorable men. Brother Taylor has told us that you are all Grangers, and that is the best proof that you are honorable men.

Now, kindly excuse me if I talk along Grange lines altogether, because you will take notice that I belong to the Grange. Our worthy agricultural expert here blames me for blowing the Grange too high sometimes, but I know he will forgive me if I talk a little on Grange lines today. I want you members of the Board to see our resources. I would like you to come out over the country. You will learn that we are a cattle and sheep county. We've got good sheep yet, as good as you will find any place. We don't have the number we used to have, but we've got as good cattle as can be found anywhere. At the Chicago Fat Stock Show, we had the best steer for two years. We have got as good horses and hogs as can be found anywhere. Outside the door I met a man from Lancaster county, and he thinks they've got good things there. So have we. You folks have done a great deal for us. I want to thank you. We appreciate how you have got our State College to the place it ought to be and are trying to get it better, so we can educate our boys to stay on the farm and we appreciate the efforts you are putting forth to get more appropriations for our colleges and we appreciate the good work you are doing in the county institutes. Along in February, I was out at the little town of Hickory. It is paved with brick and its gates are pearly white and its inhabitants are made up of retired farmers and old maids. Even Brother Taylor is thinking of moving there. Maybe he will get a wife. There's where those men met last winter and gave us a great many ideas that we are going to carry out.

Then there's another thing I wish to speak of—the county expert. We learn a great many things from reading, and hear a great many things, but sometimes can't put them into practice; but the county expert we have here goes out on the farm and sees our mistakes and tells us of them. If we have done a good thing he pats us on the back and tells us about it and we greatly appreciate what he has done and hope he can stay with us from year to year.

And we also appreciate what you gentlemen have done in the way of legislation. You are getting for us a great deal. You haven't got it all; you can't get it all. Politics has a great deal to do with it and the farmers sometimes don't understand it.

It's a good deal like the story I heard of a man, a typical farmer, where they were putting a telegraph line through his place. They came along with their poles and diggers and commenced to dig. He said, "This is my land; what are you doing this for?" They said, "We've got the papers out here and we are going right through." He didn't know about that, so he went back to the barn and turned out his fine Jersey bull, and the bull went out to where workmen were and they took to the tall timber and climbed those poles, and after an hour he went out to them and said: "What are you men doing?" They replied, "You take that fellow out of the road." He said, "Why didn't you show him your papers?" That Jersey bull is the Grange, and the Grange has got to switch its tail and paw the dirt, and whenever the Grange does that, remember the politicians will take to high places, and we are not going to call the bull off, either.

Now, gentlemen, I am going to make mine short, because I know we haven't got the time. I want you to consider that you are welcome in our county. Visit every place of interest we've got and the place of most interest is our farms. We are glad to have you come, and we know that in your meeting here this week you will devise things for our good and will lead up to better and better things, until the farm will be the happiest place on earth.

The CHAIRMAN: The first response will be by the Hon. N. B. Critchfield, Secretary of Agriculture of Pennsylvania. I have the pleasure of introducing to you Mr. Critchfield.

**Mr. Critchfield's address is as follows:**

## RESPONSE TO ADDRESSES OF WELCOME

By HON. N. B. CRITCHFIELD, *Secretary of Agriculture.*

Mr. Chairman, Mr. Hoyt, Mr. Duncan, Mr. Rankin, and other Citizens of Washington County: I certainly voice the sentiment of all the members of the State Board of Agriculture, and the Farmers' Institute force, when I say that we are glad to be with you. We have heard of your fame in the respective sections of the country from which we come, and we are just as glad to be here to receive this welcome as you are to extend it. You, gentlemen, have said in part that you are glad to welcome us because of what we are and of what we are doing, and we are glad to be here to partake of your hospitality because of what we know you are and what you have been doing in the past.

You know the people that are properly brought up always have great respect for age, and we recognize you as one of the oldest counties in Western Pennsylvania. I believe I am right in saying, that Washington county was the first county created under an Act of Assembly after the Declaration of Independence. Is that correct? I think it is. And you have further shown to the world your antiquity by being the mother of some of the little counties around you, such as Allegheny, Greene and Beaver; and for this reason, if for no other, we would come here with feelings of profoundest respect for Washington county.

We have heard of your rich soil and your abundance of the good things with which kind Providence has blessed this grand old Commonwealth. We, over in Somerset county, the place from which I come, have known something of the fine stock you raise in Washington county for a number of years. Thirty years ago I placed at the head of my herd of cattle a young animal that was brought from your county, as fine a specimen of the short-horn Durham as I ever saw anywhere, even in the blue-grass region of Kentucky. Mr. Duncan failed to mention sheep, but I was glad to hear Mr. Rankin say that you still have your sheep. Somebody said today that in recent years you have more dogs in Washington county than sheep. That is certainly very unfortunate, yet I hope you farmers of the county will remember that a fence strong enough to turn a dog that is large enough to kill sheep, can be built at no very great expense, and a woven wire fence of that kind will turn the dogs, and if the Congress of the United States would look upon your industry favorably, I do not see why you should not enjoy this prosperity as you have done in the past.

The first member of the first State Board of Agriculture from Washington county that it was my privilege to become acquainted with, the Hon. John McDowell, has gone to his reward long since. He was a man who was revered in the State Board of Agriculture, and I am very glad that when he was called from labor to reward, the people of your county saw that his place was well filled by those who have succeeded him. He came to my mind when I was speaking of the sheep industry, your wool industry, and that brought up the thought that your county has the honor of furnishing the wool of which the cloth was made that made the suit of clothes that was presented to President McKinley for the day that he delivered his inaugural address. A sample of that cloth was submitted to me at that time for my examination. I was then Chairman of the Senate Agricultural Committee of the State of Pennsylvania and Mr. McDowell brought a sample of that cloth down to Harrisburg, and I had the pleasure of seeing what it was like before it was made. These things have come to my mind while I was listening to the addresses of welcome.

We were glad to hear of your wealth, the natural wealth that you possess. We were glad to hear of what you were doing in these recent years, and I didn't know but that possibly some mention would be made of the fact that Washington county stands among the very first in Western Pennsylvania in the great educational work for which the people of this section of the State are noted. I believe that the first literary institution in Western Pennsylvania, west of the Allegheny Mountains, was established right here in Washington county. The first one, if my memory serves me, was established a short distance north of here, at Canonsburg, and that was followed a short time after by an institution that was planted at this place which, a little more than a score of years ago, absorbed the older institution, and is now the only college that you have in the county. Is that right?

So we respect you, not only as being good farmers, but because of the fact that you are educators. I remember hearing Washington College and Jefferson College spoken of when I was quite a small boy. The Hon. Jeremiah Black, who was a member of President Buchanan's Cabinet, and who was one of the most noted jurists that was produced by this State or any other in this great country, was at my father's home when I was a little boy, and I heard him speak of the colleges here in Washington county, and if my memory serves me, I think he said that he had been a student here, either that, or that some of the law students who were then in his office, were students at the Washington or the Jefferson College. These things I have recalled as I have been sitting here listening to these addresses of welcome.

I really did not expect to have anything to say here today. Mr. Martin said to me a few minutes ago—asked me whether I had noticed that he had placed me on the program to respond to an address of welcome, and I laughingly said, "Yes," but I thought it was all a joke, until I was on my way here and looking over the program, discovered that it was more earnest than jest, so I have no prepared speech. But I want to assure you, Mr. Chairman, and gentlemen, and all the others, that we are very glad to be here, and possibly I might occupy a few minutes.

Just now there comes to my mind a little incident that occurred to me when I was a boy in the section of the country from which I come. A party had gone out of an old-fashioned protracted meeting one night and we were riding on the sled of one of the old men of the neighborhood who was known to be a very slow driver. It was a beautiful, moonlight night and all at once it was discovered that he was whipping up his horses and driving at what was, for him, a fierce rate of speed. Someone said, "Why do you drive so fast?" He answered, "I see that one of my sled soles is nearly worn out and I want to get home before it is entirely gone." So we must get through before we have expended all our energy and it is necessary for us to hurry along.

I want to occupy, however, just a minute in telling you who we are. You have spoken of us as farmers and members of the Grange and we are proud to be regarded as such. I appreciate that and I think we all appreciate what was said by one of the speakers, when he referred, not only to the antiquity, but to the honor of the profession to which we belong, and you will understand that we do regard agriculture as a profession, as one of the learned professions. It does seem to me that the farmer needs to be a more thoroughly educated man than any other man. He comes nearer to the great forces of nature. He has more to do with the forces of nature than does the man who belongs to any other vocation, or is engaged in any other business, and hence, I say, he ought to be a most thoroughly educated man.

We are here, not simply as members of the State Board of Agriculture, but we are here as Institute Instructors, as Institute lecturers. The work that is being done by the State Board and by the Department of Agriculture has been referred to—the Institute work in which we are engaged. This entire State has been covered every year for about twenty-five years. I am not able to tell just now, off-hand, how many years this work has been going on in Pennsylvania, but I know that it began somewhere back in the 70's, and at the present time we have about seventy lecturers engaged in this work in this State. These men travel all over the State during the fall and winter seasons, when farmers have time and opportunity to attend the Institutes, and give instructions to the farmers as to the methods of cultivating their soil, of taking care of their trees, of pursuing every particular line of the farming industry.

It is true that these men are not all graduates of an agricultural college. Many of them have graduated from the school of the farm itself and got a very large amount of their education between the plough handles, or at the end of a shovel or a corn hoe, or some instrument of that kind, but we have come to understand in recent years that all knowledge is scientific knowledge. In fact, the word "science" itself signifies knowledge. It comes from "scientia," to know knowledge; therefore, that which is definitely known is scientific knowledge. We have among us here today men who perhaps have never been students in college, but who understand their business as farmers. They have come to understand the proper methods, by their own experimentation, of cultivating and fertilizing the soil, of using the right kind of seed, of taking advantage of the seasons, just as though they had learned it in school, and this is the class of men that are being sent out by the Department of Agriculture, or by the State Board of Agriculture, if you please, all over the State of Pennsylvania. The farmers of the present day, in Pennsylvania, and not only in our own State, but all over this country, have great reason to be thankful for the advantages they enjoy above those that were enjoyed by their fathers.

The Federal Department of Agriculture has sent men all over the world in order to discover new plants and new seeds and bring them here into our own country. We have had seeds that were grown in Siberia and away off in Norway, brought into America, and they have been planted in some of the northern sections of our country and have brought forth excellent results in sections of the country which were never supposed to be adapted to their growth, and this information has been gathered up by the farmers and has been applied upon their farms. They have worked out very many of the problems that have become the most important problems that were taken up and studied by the agricultural colleges of our country, and so we are here as instructors, going over the State of Pennsylvania during the proper season of the year and doing whatever we can to assist the farmers in the great work that is upon their hands; and it is certainly a great work.

We are talking just now about the possibility of war. I do not believe that there is any likelihood of anything of that kind coming upon us, and yet there is a possibility, while there is, to my mind, no probability, but, sir, in case there should be a war, the position that is occupied by the farmer is just as important as that occupied by the soldier or by the general of the army. It is not only necessary that our armies shall be well equipped in case of war, but there must be something to support the army. During the Civil War, in which quite a number of us, we older members of the State Board of Agriculture, had some part, we were successful, not simply because we outnumbered just as brave a class of men as were to be found anywhere, but we were successful for the reason that we had sufficient population to have people enough at home to be raising the grain and the horses and the beef and the other things that were needed for the support of the army; and so I say, that the farmer is not only here to feed the people in time of peace, but he is here to stand in support of the armies that must go forth to fight the battles of the nation.

I don't think that the gentleman who delivered one of the addresses of welcome, I refer particularly to Mr. Duncan, I don't think that he went any too far when he spoke about the great importance of the work in which we are engaged. What would become of the whole country, if for six months the farmers of the country were to stop their operations? We cannot think of any greater calamity being possible to come upon any people anywhere than would come upon us, if this were the situation that we had to meet.

Now, then, we are glad to be here. I am glad to be here, particularly, because, while I was sitting here, the thought came to me that, although my ancestors were not born and bred in Washington county, my great-grandfather was a citizen of the county for awhile, and at the close of the War of Independence, he, with four brothers from Washington's Army, who had entered the army from Virginia, at the close of the War, came here to farm, and my great grandfather went back to the eastern slope to find a brother who had not come out with the others, and passed through Somerset county and decided that it was a land overflowing with milk and honey and he would cast his lot there, and so I happen to be a native of

Somerset county, simply because by great-grandfather thought he had found in it a better land. The others went out to Ohio and the Critchfields of Holmes and Wayne counties, Ohio, are part of the same family, and I am glad to come back here and enjoy your hospitality for this reason, if for no other.

I thank you, Mr. Chairman, for the attention you have given me, and I thank you, on behalf of this meeting, for the very cordial welcome we have received.

The CHAIRMAN. The next address along this line will be by my friend, Prof. Franklin Menges, of York county, Pa.

Prof. Menges spoke as follows:

## RESPONSE TO ADDRESSES OF WELCOME

By PROF. FRANKLIN MENGES, *York, Pa.*

I cannot claim any ancestral relation to this county; I suppose you notice it by my speech, don't you? History, is in order. You know we fellows in the eastern part of the State think that we are sort of guardians of the rest of you people; we are older than you are and we have learned a little more about farming than you have, and we have some sort of a notion that we can look down upon nearly any class of farmers, just as soon as we get across the Allegheny Mountains, at any rate.

Now, when it comes to age, you are ahead of us. Do you know that Queen Elizabeth gave this territory, in which your county is located, to Sir Walter Raleigh, her paramour, March 25, 1584, long before there were any Dutch in New Holland, or New York; a long while or nearly a century before William Penn landed in Philadelphia and brought all the Quakers over here, among whom he brough my friend, Dr. Conard. And then he had a lot of Dutch with him. He brought Kester along, too. A century before that time this territory already belonged to England, and to an Englishman. So, in history, you are really way ahead of us. We cannot look down on you.

Now, my friends, we have another pride over there in the eastern part of Pennsylvania and that is, we are proud of the fertility of our soils. We think we have the best soils in the State of Pennsylvania, and that is pretty near true. But when we come to Washington county, we find that you have just as good soils as we have, even in Lancaster county, and I don't see Mr. Herr here, or he might object. We find that in Washington county you have naturally as fertile soils as we have in Lancaster or York or any other of the eastern counties, and that you can produce just as large crops of the various cereal grains as we can in the east.

And then another thing, you have a greater variety of soils. There are just three formations in this county, geological and in spots—my friend, Mr. Stout, will enjoy this—it's first the lower barren coal measures, then the upper coal measures and then the upper barren measures. The first are confined to the northern part of this county, the second largely to the central part, and the third largely to the southern part of the county. In that upper barren coal measure formation, there are about 170 to 200 feet of limestone strata interwoven with shales and sandstones, mixed up in such a way that we don't have anything like it in the eastern part of the State. When you have a mixture of limestone and shale you can make one of the best soils that can be made anywhere. Now, my friends, we don't have anything like it.

Another thing that you have that is a great deal better than our conditions is, that you have coal and oil, already referred to. I heard of a man here in Washington county who had two hundred acres of land. He sold the Pittsburg coal vien under that land for $700 an acre and he had an oil well on that farm from which flowed at the rate of 7,000 barrels of oil a day, at $1.85 a barrel, and he had a soil on top that would produce at the rate of 100 bushels of ear corn to the acre during any normal season. Now can you beat that?

The SECRETARY: And his name was not Job, either.

PROF. MENGES: I don't know anything about that.

The SECRETARY: Why, you spoke of the days when the hills poured forth rivers of oil. I just happened to think of it.

A Member: That's in the Bible.

MR. HUTCHISON: He don't know anything about that.

The SECRETARY: Buy yourself a Bible.

PROF. MENGES: I'll have to stop associating with you. Well. I simply refer to these matters. I say I don't remember about that story of Job.

The SECRETARY: Well, he was a farmer, too. He washed his steps with butter.

PROF. MENGES: Yes, he's too rich for me. I can't keep up to that standard. That suits you and Seeds better than me. I said, that historically and in productive capacity, and in coal and oil you are ahead of us. My friends, that is all true.

There is another side to this question; there are some things you don't know and I might just as well tell you about them when I am here, because I don't expect to get back again. You know that in Washington county, you have 551,708 acres in farming land. Out of that—553,000, I should say—do you know that you have only 503,000 occupied in farms today? Now just think of it, that there should be at the rate of about 45,000 acres of farming land in the county of Washington that is not farmed. In 1900, you farmed 23,000 acres more than you farmed in 1910, or in other words, you have gone back at the rate of 23,000 acres in ten years. Your population in 1900 was 83,000, or a little lower; in 1910, it was 143,000. Your population has gone up at the rate of between 30 per cent. and 40 per cent. and your farming land has gone back at the rate of about 5 per cent. to 6 per cent. My friends, that is not a very pleasant condition to look forward to with the advantages that you have. I say these are things we ought to consider. You had a population of nearly 50,000 more people to feed in 1910 than you had in 1900, and yet you farmed 23,000 acres less of your land in 1910 than you did in 1900. And let me say to you, my friends, that that condition prevails over the entire State of Pennsylvania. Even Lancaster county, the farming county of the State, farmed about 3,000 acres less land in 1910 than she farmed in 1900, and when you cut across to York county, we are farming about 10,000 acres less than we farmed in 1900. Not only is that true, but here is another condition. I will go back to 1870 and I find that in Washington county, in 1870 there were 428,000 sheep, and in 1910, there are only 196,000, and all under the Protective Tariff! We had a tariff when that thing happened; now just think of it, and I'm a Republican!

A Member: I wouldn't acknowledge it.

PROF. MENGES: Well, there are a good many things you dare not acknowledge. Are you going to keep quiet now? I said I was a Republican. And another thing, I am a Protectionist, but just think of it. But I say that in 1870 there were 428,000 sheep in Washington county, and in 1910, only 196,000, and all under protection.

My friends, it looks to me as if you and I had better look a little further than protection about the sheep business. That's the way it looks to me. I am inclined to think that there is something else that you and I had better be about than the protective system. If that farmer with the protective system could not obtain a price that would justify him in keeping sheep, what good did the protective system do him? Isn't that a fair question?

The SECRETARY: Well, he didn't get protection from the dogs.

PROF. MENGES: I am not talking about dogs now. Did the price of wool with protection stay up to what it was in 1870? It should have, and why should it? Because there were more people to clothe. In 1900, you had 83,000, if I mistake not, to clothe here. In 1910, you had 146,000 to clothe. Now don't you think that the price of wool should have stayed up and gone up with protection behind it and the increased number of people to clothe? I should think so, that is only logical to think so, but what is the trouble? Now, my friends, the Farmers' Institute is an institution for the purpose of training the people. You agree with that, Mr. Seeds, don't you?

MR. SEEDS: That's right.

PROF. MENGES: And it is especially an institution for the purpose of training the farmer. Now you and I and every one of you that are before me this afternoon have gone over the State and tried to induce these farmers to produce more and more, and that is the fundamental thing to do. There is no question about it, in my mind, that is the first thing to do, to get the farmer to produce more. I am decidedly in favor of it and there are a great many reasons why I should be. Among the first one is because for his own benefit he must do it. But there is a greater reason than that even, and that is the maintenance of the industrial system that you and I have helped to produce in this country, the greatest industrial system that was ever produced in any nation. There is no nation today that has an industrial system such as the United States of America has.

Another thing, England could never have become what she is today had it not been for the United States producing the stuff that was necessary to feed her people, in order that she might create her industrial system. Had it not been for the United States of America, Germany would never have started out in the creation of an industrial system, and why not? Because she could not feed her people. The United States is feeding them; Canada is feeding them. Australia is feeding the industrial hands that are working the system of England and Germany, and were it not for those countries, it would be impossible for Germany and England to maintain themselves.

Another thing; we have not only done that, but we have fed the people that created our own system and we have fed them with the cheapest kind of food. There is no other nation that can boast of an industrial system that has been created as cheaply as that of the United States; there is no such nation. Why not? Because we had cheap land, we could produce cheaply. There are men before me here this afternoon who passed through the time when they sold wheat for 50 cents a bushel. Didn't you? Certainly you did.

The SECRETARY: And corn for 20.

PROF. MENGES: Yes, that was the time when we made our industrial system. Do you know it? That was the time we built the railroads across the country. That was the time when Mr. James G. Hill started out to build that railroad through the Northwest and he is the greatest railroad pioneer in this nation today.

A Member: But we have no more of money now than we had with 50 cent wheat.

PROF. MENGES: I will let you discuss that, I won't talk about it. I say we created that system at that time. Now then, things have changed. Our industrial system is created; our railroad system is created. We had enough to eat through the process of creation, but the time has come when it looks as if we were not going to have enough to eat, and who is agitated by it? Why, the industrial system is agitated, the commercial system is agitated, the railroad system is agitated about it, and they want to know, what shall we do, and everybody wants to help us along, to do what? They are trying to get us to produce more, that's the thing that they want us to do, want to do what? To maintain conditions such as they are at the present time.

Now my friends, the maintenance of conditions such as they are at the present time depends entirely upon that farmer and upon nobody else. He is the one on whom it depends. Why is it that you have 23,000 acres less farming land today than you had in 1900? Simply because we have put a certain class of men into a position that they can pay better wages than you and I can pay, that's why. I said because we have put a certain class of men into a position that they can pay higher wages than you and I can pay. I need not go any further than my own county. I know what has happened there. The farms outside of York and some of the richest farming land in the State of Pennsylvania is lying there, and some of it, regardless of what some of you think about our farming, some of it, is not farmed at all. Why not? Because the men who farmed it can make two and three and four dollars a day working in the factories of York, whereas, if they would work on the farm, they could make a dollar or a dollar and a half or two dollars a day. Now my friends, you wouldn't think well of a fellow if he would say, "All right, I'll take the dollar fifty or two dollars a day, instead of four dollars a day down there in the factory where I work only ten hours, whereas, on your old farm I'd have to work from daylight till sunset and sometimes till nine or ten o'clock at night." I am not advocating those things, but that is the condition that is confronting us today. We must put that farmer into a position so that he can pay the same wages that are paid by any other organization or any other industry, and just as soon as you do that, just that soon you will get the fellows back to the farm.

A Member: That will bring down the prices of the products.

**PROF.MENGES:** Well, that is an entirely different question and I would like to handle that for a while, but haven't time this afternoon. Now I see where we are. I said the Farmers' Institute is the training school of these farmers of the State of Pennsylvania, and that Farmers' Institute lecturers of the future will have to be a great deal bigger men than we fellows are that are at it now, in order to give the kind of instruction that is needed to keep that man on the farm and make him a man that will produce the stuff that is needed, for what? For the purpose of feeding our industrial system, our transportation system, our mining system and our commercial system, and I don't like to include that last—I say I don't like to—I'm going to say something mean.

A Member: I wouldn't do it if I couldn't prove it.

**PROF. MENGES:** There never was a nation that was cursed with a commercial system of such unparalleled cussedness as the United States is. That's pretty strong, isn't it? Maybe you don't believe it.

A Member: Have witnesses to prove it?

**PROF. MENGES:** Now, my friends, I don't like to say a thing like that, it hurts me to say it and maybe I should not say it, but it looks to me as if somebody should say it, and I might just as well do it as somebody else, because maybe I can do it in a little pleasanter way.

Well now, don't you see where we are? That fellow, that Farmers' Institute lecturer in the future, must be a bigger man than he has ever been before. I don't know of any other institution, my friends, that can take its place. There isn't another institution that can take the place of the Farmers' Institute for the instruction of the farmer and for the purpose of reaching him. The Institute goes right to him. Now don't you see what is at stake? Our agriculture is at stake; our industrial system is at stake; our mining system is at stake; our transportation system is at stake, and our commercial system depends entirely upon that farmer.

Now, my Farmers' Institute friends, I have talked too long, but I wanted to get to a point, don't you see, where we are. You see what you need. Mr. Martin and the Secretary here are aware what is needed in the State of Pennsylvania, as well as I am, and there are a number of others here who know these things just as well as I do. The likelihood is that you have not expressed them in the way that I have. Now my friends, I look at it in this way, that it is through the agency of the Farmers' Institute, it is through the agency of the legislation that has recently been enacted by the Legislature, that it is possible for the Agricultural Department to take that farmer and put him into a position where he can maintain himself, where he can maintain our industrial system, where he can maintain our commercial system, where he can maintain the transportation system and where he can maintain the mining system of Pennsylvania, the greatest that exists today anywhere. Now you see, here is something for us to do and I hope that hereafter the Institute lecturers will feel their responsibility and that they will go out with a message that will take that farmer and lift him up to a higher standard than he has occupied heretofore.

DIRECTOR MARTIN: My friends, before we start upon the program proper, the clerk will distribute pencils and blanks for the purpose of giving the members and others an opportunity to write down such questions as may occur to them from time to time and make notes of lessons that may here be developed relative to the Institute work for the coming season. I may say, in addition, that we have assembled and are just entering upon the active work of our three days' meeting. It is a source of great gratification to listen to the addresses of welcome. We are certainly thankful for the generous hospitality extended to us in the opening sessions of this meeting. The programs have been distributed and they are here for anyone who desires them. They will be distributed from time to time, and if permitted, the suggestion is possibly in place now to the County Chairmen of Institutes and lecturers who are present, there is nothing that tends to the success of any meeting to a greater degree than promptness in all we do, promptness in attendance at the time set and regularity in that attendance. Our time is brief, our program is a full one, and, as we believe, replete with subject-matter that will not only interest the Convention proper, but we feel confident that the farmers and residents of this city will be interested in attending these meetings, to which they are entirely welcome.

This and subsequent roll-calls showed the following members present:—

### COUNTY INSTITUTE MANAGERS

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|---|---|
| A. I. Weidner, | Adams county. |
| A. J. Purdy, | Allegheny county. |
| S. S. Blyholder, | Armstrong county. |
| A. L. McKibben, | Beaver county. |
| W. F. Biddle, | Bedford county. |
| Howard G. McGowan, | Berks county. |
| W. Frank Beck, | Blair county. |
| B. F. Wambold, | Bucks county. |
| W. H. Milliron, | Butler county. |
| Lewis J. Bearer, | Cambria county. |
| M. E. Conard, | Carbon county. |
| Edward Lienhard, | Chester county. |
| Harrison Straw, | Clearfield county. |
| Joel A. Herr, | Clinton county. |
| A. P. Young, | Columbia county. |
| J. F. Seavy, | Crawford county. |
| Archie Billings, | Erie county. |
| John T. Smith, | Fayette county. |
| Frank Rauck, | Fulton county. |
| J. W. Stewart, | Greene county. |
| G. G. Hutchison, | Huntingdon county. |
| S. C. George, | Indiana county. |
| Peter B. Cowan, | Jefferson county. |
| Matthew Rodgers, | Juniata county. |
| Horace Seamans, | Lackawanna county. |
| J. Aldus Herr, | Lancaster county. |
| Sylvester Shaffer, | Lawrence county. |
| Edward Shuey, | Lebanon county. |
| J. E. Hildebrant, | Luzerne county. |
| W. C. Black, | Mercer county. |
| M. M. Naginey, | Mifflin county. |
| F. S. Brong, | Monroe county. |
| J. H. Schultz, | Montgomery county. |
| J. Miles Derr, | Montour county. |
| C. S. Messinger, | Northampton county. |
| I. A. Eschbach, | Northumberland county. |
| C. M. Bower, | Perry county. |
| A. T. Crittenden, | Potter county. |
| John Shoener, | Schuylkill county. |
| F. F. Glass, | Snyder county. |
| J. C. Weller, | Somerset county. |
| F. A. Davies, | Susquehanna county. |
| J. Newton Glover, | Union county. |
| W. A. Crawford, | Venango county. |
| G. A. Woodside, | Warren county. |
| D. S. Taylor, | Washington county. |
| W. F. Holtzer, | Westmoreland county. |
| George A. Benson, | Wyoming county. |
| G. F. Barnes, | York county. |

## INSTITUTE LECTURERS

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|---|---|
| H. M. Anderson, | New Park, Pa. |
| M. S. Bond, | Northumberland, Pa. |
| J. T. Campbell, | Hartstown, Pa. |
| Fred W. Card, | Sylvania, Pa. |
| Dr. M. E. Conard, | Westgrove, Pa. |
| H. P. Davis, | State College, Pa. |
| E. B. Dorsett, | Mansfield, Pa. |
| W. M. C. Drake, | Volant, Pa. |
| F. H. Fasett, | Meshoppen, Pa. |
| Mrs. Jean Kane Foulke, | West Chester, Pa. |
| Sheldon W. Funk, | Boyertown, Pa. |
| G. C. Given, | State College, Pa. |
| H. M. Gooderham, | Patton, Pa. |
| Joel A. Herr, | Millhall, Pa. |
| E. K. Hibshman, | State College, Pa. |
| J. B. Johnston, | New Wilmington, Pa. |
| R. P. Kester, | Grampian, Pa. |
| Dr. Louis A. Klein, | Philadelphia, Pa. |
| Prof. Franklin Menges, | York, Pa. |
| W. M. Patton, | Mosgrove, Pa. |
| E. L. Phillips, | New Bethlehem, Pa. |
| Chas. A. Row, | Yardley, Pa. |
| Robert S. Seeds, | Birmingham, Pa. |
| A. W. Stephens, | Hoboken, Pa. |
| Prof. F. R. Stevens, | Geneva, N. Y. |
| W. H. Stout, | Pinegrove, Pa. |
| Leon Otice Van Noy, | Troy, Pa. |
| D. H. Watts, | Kerrmoor, Pa. |
| W. Theo. Wittman, | Allentown, Pa. |
| R. J. Weld, | Sugargrove, Pa. |

The CHAIRMAN: The first topic, according to the program, is one of much interest to everyone. The topic is, "The Function of the Experiment Farms." We have with us today Dr. Charles E. Thorne, Director of the Ohio Experiment Station, of Wooster, Ohio. I have the pleasure of introducing Dr. Thorne.

Dr. Thorne's address is as follows:

## THE FUNCTION OF THE EXPERIMENT FARMS

By DR. CHAS. E. THORNE, *Director of the Ohio Experiment Station, Wooster, Ohio.*

I have been very much interested indeed in the discussion this afternoon. The questions that have been brought before you are certainly of very great importance. They are questions that we are realizing over in Ohio in a very forceful way. I am not acquainted with Pennsylvania conditions. I am acquainted with Ohio conditions and our statistics show that fifty years ago we were producing within a couple of bushels to the acre as much wheat and the same amount of corn, or probably a little more than we are producing now. We have been contented to stand for sixty years at a uniform rate of production, which amounts to an average income per acre of something like ten dollars at present prices; for the land under cultivation. Meanwhile, the rate of wages has gone up, until the situation now is that more than half of our Ohio farmers are earning less on their farms than they are paying the men who help them by the month. We have made a census of a township just over across the river in Ohio. wherein the income was carefully ascertained for the major portion of the farmers of that township. We find that 60 per cent. of the farmers of that township are actually earning less for their work than they are paying the men who help them by the month. A few are earning more than this, a few are earning from a dollar to a hundred dollars a year more, and a few are earning very comfortable wages, very comfortable livings from their work. To cultivate land which will only produce 12 or 14 bushels of wheat to the acre and 30 to 35 bushels of corn to the acre, means a scale of living too low for people who have the opportunity to look around them that our young people have in Ohio. The consequence is that these young people have left the farm and are going to the city. They have not always done better by going to the city, I trust, and yet the stream has constantly tended away from the farm and into the city, and largely because of the meager return which our Ohio farms, under the old system of Ohio farming, have been yielding.

We are up against the alternative of two propositions; our farms must yield more to the acre or our farmers will go back to the condition of the peasant farmers of Europe. There is no choice between these two positions—one or the other thing must happen—and it is because those whose vision has been above the ordinary level have been able to see this, that such institutions as the Experiment Stations have been established, for these conditions have not been confined to Ohio alone. You all know of the fact that in many sections of the Eastern United States farms have been sold for many years past at less than the cost of the improvements on them. Such conditions prevail in many parts of Ohio yet and prevail to a larger degree in some portions of New York and New England, and I say it is because those whose vision has been above that ordinary level have been able to realize this, that such institutions have been established.

These experiment stations have now demonstrated beyond all question that it is possible, by the application of scientific methods to agriculture, to enormously increase the production of the land; but what is the reception with which this demonstration meets? Some of you have seen in an eastern agricultural journal recently the complaint of farmers, that the experiment stations and the institute speakers and the teachers in the colleges of agriculture are trying to teach the farmers how to produce more to the acre when they already produce too much, because, whenever you get a good crop, it sells for less than a poor one. We know that is true and we know, also, those of us who look abroad, know that unless we do learn to make the acre produce more than it has done hitherto, the time is coming when our children or grandchildren will go hungry. There is no alternative between those two propositions. The acre must produce more than it is doing or the future generations will go hungry in our country as they have gone hungry and died by the millions of starvation in Asiastic countries; but the reception agricultural stations and lecturers and experiment stations are getting from many of the farmers is that the workers who are trying to show how this should be done, are parasites on the body politic, (you will see that within the last year or two), loafers—and we realize and have realized for years that in many cases our work is met in just that way.

It is not altogether a problem of showing how the thing is to be done; the problem is to get down to the farmer himself and overcome his inertia and show him the better way. We are cultivating parallel strips of land side by side over on the Experiment Farm at Wooster, a farm that had been rented for a quarter of a century before it came into our possession and had been at the tender mercies of the tenant farmer for that period. On one type of land, duplicated five or ten times over, we have been able to produce as an average, with the best cultivation we knew how, a thorough drainage to begin with and the best tillage we knew how to give, we have been able to produce an average of a little over ten bushels of wheat to the acre for ten years past, the land being farmed in rotation with the best tillage we knew how to give. Right alongside, separated by strips only two feet wide and just duplicated again in the same way, we have produced over thirty bushels of wheat to the acre, with the same tillage, the same seed and the same rotation, the same cultivation in every way, except that on the one hand we have left the land under the management which had prevailed before, and on the other hand we have applied the suggestions which modern science has given us in the feeding of the crops. In other words, our Ohio farmers are contented to travel over two or three acres of land, to seed two or three acres of land, to cultivate two or three acres of land, to get the produce of one acre, and they are doing that notwithstanding the information that has been put before them for at least ten years past, that a better method was possible.

We have about 272,000 farmers in Ohio, something over 60,000 of those farmers have asked for our Bulletins, the publications of the Experiment Station. The attitude of the other 200,000 farmers is fairly represented by the words of the young man in the streets of Wooster a year or two ago, when the College of Agriculture, which has no connection with the Experiment Station, when the College of Agriculture had come to Wooster with one of its movable schools of agriculture, the schools being held a week at a place in different sections of the State. Someone asked the young man if he was going to attend that school of agriculture. He replied, "No, I know more about farming in a week than them sapheads up at the Experiment Station does in a year." We have to meet this attitude of the farmers of our country, our friends and neighbors all around us, before we can accomplish the work that is before us.

How are we to meet his attitude? That is the question we have to answer, you and we, you Institute workers and the Institute workers in Ohio. We have been holding Farmers' Institutes in Ohio for thirty years; there nowhere circulates a better grade of agricultural press than in Ohio; there is nowhere a better college of agriculture than in Ohio, but with all this work, that is the attitude we have to meet, and it is sometimes an attitude that is almost discouraging to those engaged in the work. And before we can successfully reach these people, we must reach those whose heads are above the level, and fortunately, we have them everywhere in Pennsylvania and in Ohio both. Here and there we have one whose vision is wider, who can see farther than the majority, and to reach these is the problem that is set before us, to reach such as these the Legislatures of both States have established experiment stations under the patronage of the Federal Government, the object of these experiment stations being to work up and reduce to farming practice the principles by which the yield of the land might be increased and might be economically increased. We desire to increase the yield, if the expense of the increase does not outweigh the value of the increase, but that point must be kept before us all the time.

Thirty years ago the experiment station was established in Ohio. It was not long before we began to realize that an experiment station located on a single type of soil could not answer satisfactorily questions for other and different types. We began more than twenty years ago to reach out to establish auxiliary stations, test farms, we called them, not equipped with scientific laboratories and all that paraphernalia, but simply farms on which the problems of differences of soil constitution could be intelligently studied. This work has gone on, until the Ohio station now has some eight of such outlying farms. To illustrate the difference in the results which we obtain on these farms from the treatment of soil,—the main station at Wooster has produced an average net profit of $14 per acre for each five year rotation on crops grown in rotation and treated with fertilizing combinations. The same treatment on soil treated in the same way, both as to drainage and rotation and tillage, on a farm forty miles away, on a different kind of soil, has given us a net average profit of 64 cents. Now, you can see that if we had based—if our knowledge had been limited to the one farm on which we were located, what a different teaching we would have been giving to the people of the State than we must give with the knowledge that soils may be radically different in their condition. This led to the extension of these farms. As fast as possible they are being extended to include the principal soil types of the State. We do not expect, of course, to include every soil, but the principal soil types of the State are being brought under control in this way.

We first undertook to do this by the establishment of test fields, by co-operative work with farmers on the different soils. That seemed the rational way to go at it. It looked as if it would be a great deal cheaper to get a farmer to carry out under our instructions a particular test than to purchase a farm and equip it and maintain it for this purpose. The outcome was continually disappointing. The difficulty was that we did not succeed in finding farmers who were willing to set aside land for an indefinite period for such purposes. Our work soon showed that if this kind of research is to bear fruit of permanent value, it must be continued for a period of we know not how long in one place in order to accomplish results. To illustrate that point more clearly: In 1894, we harvested a crop of wheat on the main station farm at Wooster, that had been treated with various fertilizing materials. It was the first application of fertilizers to this tract. A number of the applications contained acid phosphate as a carrier of phosphorus. In every case where acid phosphate was used that year, the yield of wheat, of grain, was less than it was on the unfertilized land alongside, and yet, as we look back over the nineteen years that have elapsed since that experiment was begun, the average increase of wheat over this nineteen years has been nearly 28 bushels to the acre. You see what a terrible mix we would have made if we had stopped our test with that one experiment and based our recommendations to the farmers on that one point, and that is what is too often done, we are too apt to take a single test and jump at conclusions from that.

If our work at the Ohio Station has demonstrated one thing more than another, if it has demonstrated that one thing is of greater importance than any other, it is that this study of the soil must be continued through a long period of years, in order to overcome and equalize the variations due to seasonal differences. Take the first year's work out at Wooster, the first five years' work at Wooster, and compare it with the second five years, we find that the increase during the second five year period has been in many cases double, and some cases more than double what it was during the first five years. The explanation is easy. As we look back over the nineteen years now and study our results not only there, but at the six or eight other farms we have now under test, we find that invariably the application of fertilizers on land previously untreated fails to produce its full effect. The crops immediately fertilized never secure, never obtain, all the fertility given in this first application. From half to one-third, taking the average of all our work, from half to one-third of the effect of an application of fertilizers is carried forward to succeeding crops, and in the case of manures, the difference is still greater than that, so that you see, taking this part alone, it takes a long period of years to arrive at results which will serve as a safe guide from which to teach how to use these materials.

We have not found so great a difference in effect on different soils as these first ones I spoke of, in other cases, but we find that no two soils give exactly the same returns from fertilizer treatment, but that each soil must be studied by itself. Each crop has its own peculiarities, as I said this morning, every plant has its own likes and dislikes, its own aptitudes, and these must be studied, but the important variations are in the soils rather than in the plants, and we must study the soils; we cannot move them into our laboratories and analyze them there and tell what they need; that has been exploded long ago, and yet every week I have to answer letters, asking us to analyze soils. We have in Ohio, in Wooster, the soils that we are working on, in the upper 7 inches of soil, 18 and 20 tons of potash per acre, and yet on some of these soils so small an application as 20 pounds of potash carried in 40 tons of muriate has added four to five dollars an acre to the increase of crops. Soils that already had 18 to 20 tons to the acre, an addition of so little as 20 pounds to the acre has made that difference in the increase of yield of crops. The meaning simply is that the potash in our soils is locked up in such insoluble combinations that it yielded up too slowly for proper production, and even where there is already such a great store of potash, it pays to add a little available potash to the crops we grow.

The remark was made a little while ago—I am going back a moment—about the amount of land that lies idle here in Washington county. We in Ohio would be better off today, absolutely better off, if one-third of our land were lying absolutely idle and turned back to nature, and the energy we use in traveling over that land, trying to raise crops on land too wet or too poor for cultivation—I say if that were turned back to nature and the energy wasted on that land was expended in the improvement of other land—that is an important point.

**PROF. MENGES:** Is that done?

**DR. THORNE:** It is not done. That is the answer to those who say we are trying to teach them to grow more crops when they are already growing too much. If we could teach them to do better farming on fewer acres the outcome would be immensely better for our people.

I thought to give you a little idea of some of the points that are being worked out by this system of research farms. I was saying that we started out years ago with the idea of employing farmers to carry on this work for us. Farmers were not willing to set aside permanently land for this purpose. They were not willing to give up the land for a long enough period for results of value to be worked out of it. They were not willing to give it the care necessary; they were not willing to give the accurate weighing and measurement of crops that was necessary to accurate results. An illustration of what we encountered will be plain: We were testing varieties of wheat. We wanted to examine the behavior of these varieties on a very different soil from that at the main station. That soil is a yellow, sandy clay. We wanted to see whether there was any difference in varieties on black land, on the low, black prairie land we have in the western part of the State, and we sent samples of these wheats to one of the best farmers in that region, a young man, a college graduate, a man of very much more than average intelligence, a wealthy farmer, who had a large farm and who enthusiastically began the experiment. He carried it through nicely the first season. We induced him to repeat it the second season. He sowed the wheat, he raised it all right, he harvested it all right, but when thrashing time came, his hands were short and the weather was threatening and he rushed the whole thing through the thrashing machine together, so that when we got through we knew nothing.

Such experiences soon cured us of this method of trying to work. We found that the only way in which we, with our Ohio conditions—they are different there from what they are in Illinois and different, no doubt, from what they are in Pennsylvania, but with our Ohio conditions, the only way in which we could be sure of carrying an experiment to its completion and of getting from it results that would have any value when completed, was to have absolute control for an indefinite period of the land upon which the experiment was made, of the labor employed in making that experiment, and the only way to do this was to lease or purchase farms, to equip these farms with men and tools and implements, to have men on these farms who had no other responsibility than the execution of this work, whose wages depended on the faithfulness with which they carried out the orders given them, who had no interest whatever in the crop, who could afford to stand aside and let it be entirely destroyed, if necessary, rather than miss the experiment.

We had some bitter experiences on our farm, where we had things under, or as we thought, under control. We had a splendid crop of clover hay growing. It had been under fertilizers for several years and the results were very striking. We had also at the same time a ten acre field of magnificent clover hay, such as I described this morning. There were ten acres in one field and three in the other. Our farmer, who was one of the most faithful men we have in Ohio, could not help but be tempted by the ten acres of magnificent clover to cut that and harvest it first. He did so, then set in a period of rain. For three weeks it rained and when he got the three acres cut on the fertilized land, it had fallen down and taken second growth, while that on the unfertilized land continued to grow. He got less hay in every case off of the fertilized land than he did off of the unfertilized land, and yet there was no question at all before the hay went down that there was fifty per cent. more hay on the fertilized land than on the other. We lost our experiment completely. I told him I would rather he had simply burned the ten acres of hay that had no experiment in it than had lost the experiment. The experiment is the one thing that is of value, the crop is of no value whatever, and in order to carry out a scientific piece of work in that way, we have to be absolutely free from any financial interest in the matter. We must look only to the experiment, not to the value of the crop or the labor put on it, nothing else but working out the experiment, and the only way in which we can do that is to have absolute control of land and crop, men and teams.

A Member: Are those two farms self-sustaining?

DR. THORNE: They cost us two thousand dollars a year more than they bring in. If they were self-sustaining, they could not do the work we have for them to do; the work of weighing and measuring and account keeping must inevitably cost more. We must employ men of a higher grade than the ordinary day laborer and we must divorce that man absolutely from the work itself, from any interest in the work itself; we cannot crowd him; we cannot push him; we must have faithful work, and that means that he mustn't work from daylight till dark. he must not work to the point of physical exhaustion if he is to carry on the experimental work necessary to accomplish the results we are after.

I should say that in the organization of these farms we first leased a whole farm. We had leased the farm I first spoke of, where we only got 64 cents as against $14, at the Station, on a ten-year lease, with the option of purchase. The tobacco growers in southwestern Ohio were determined that we should take up the tobacco problem and in order to accomplish that we went into that region, and the Tobacco Growers' Association purchased a farm, paid cash for it and leased it for ten years with the option of taking it over in that time on payment of the purchase price and paying 6 per cent. annually for the lease. Since then a law has been passed in our State, authorizing counties in the State to purchase farms for experiment purposes and to place these farms under the management of the Experiment Station. We have, in the norhwestern part of the State, a great interest in the sugar beet industry, and we have a number of factories there and farmers are greatly interested in that industry. We cannot grow either tobacco or sugar beets on the main farm at Wooster. The soil is not adapted to either of those crops. We cannot grow them in a satisfactory way and one of the counties in the sugar beet region was the first to take up this County Experiment Farm Law and we have established a farm in that region where we are making the sugar beet the feature of our work. We wanted to study the country.

In southeastern Ohio, we have a great deal of farming land there that might be bought for a few dollars up to twenty-five or thirty or forty dollars an acre, and the best farms were not held at more than sixty dollars an acre. We were interested in studying the condition of those hill counties. We believed it was possible to do things which would alter the condition of agriculture and purchased a farm of 300 acres there. We are now using it for three purposes, largely for the study of sheep husbandry, and while the country is well adapted to pasture and not well adapted to agriculture or tillage; also the study of orchard conditions and forestry. Sheep husbandry involves the culture and development of pasture. We are making that farm a center of that kind of study.

To show what may be done by work of this character, we have a territory down in Washington county, our State, that was seventy-five years ago one of the great apple growing regions of Ohio and had been up to that time. It had been from the earliest settlement of the State. Marietta, you know, is one of the earliest towns settled in the State and apple growing was soon started there through the scattering of seeds by that historical character you have heard of, Johnny Appleseed. His work began in there and extended throughout the State, but that county grew apples and shipped them down the river before the Civil War in vast quatities. Their orchards for twenty years have been producing nothing and they began to cut them down. A few years ago our horticulturist went there and found an orchard that had been condemned to the axe. He got the owner to let him have an acre for that one season. The outcome was that the owner sold four hundred dollars' worth of apples from that acre, while the trees around it, thirty or forty acres, continued their former habits of producing nothing. Instead of cutting down the orchard, he went to work to take care of it and plant more trees and that county has sold a great many thousand dollars' worth of apples from that one experiment, and yet Mr. Greene, our horticulturist, had been telling, for nearly twenty years, what might be done in the orchard, but it had fallen on deaf ears. Now they are taking hold and carrying on the work.

The same thing holds in soil fertility work even more strongly than in such things as orchards. An apple orchard full of apples when the orchards all around are barren is a very striking object lesson. It is easier to develop such an object lesson because we can do that in two or three years' time. Such a question as that we can solve on leased or rented land or in co-operation.

As an illustration right there of that question of continued co-operation: The farmer in whose orchard this object lesson was given is not willing for it to be continued. Not only because he does not want to lose the income of those trees around him, but he wants the whole orchard treated and that does not leave us any measuring stick to show what may be done by treatment in that particular orchard, so we have to give that lesson up and start an orchard ourselves if we are going to make a permanent study of this question of orchard treatment. The shorter table here is intended to show the difference in results that we get on different soil formations. I will not take time to go over it. You will see that phosphorus on every soil has produced a profitable increase. We have not failed anywhere in Ohio to produce a profitable increase by the application of phosphorus on any soil that has been for twenty-five years or more in cultivation.

The meaning of that, after all, is simple; phosphorus is one of the main constituents of bone. Without phosphorus there is no life, animal or vegetable. It is found in the minutest organism, from the bacteria up to ourselves; there is no life without phosphorus.

Now in our system of agriculture over in Ohio we have been raising grain for nearly a hundred years. We dug a couple of canals across the State before the days of the railroad, in order that our grain might be carried to the Ohio River and then down the river, to feed the negroes in the South, the slaves, more quickly. Our farmers for twenty-five miles of those canals on either side hauled their wheat to the canals. Those were the first cash crops we had. Then the railroads came, elevators were established at every railroad station over the State, taking the corn and oats and carrying them out of the State. With the development of these means of transportation, the livestock industry grew less, more of our grain was shipped out of the State as grain, and I may say that but for the raising of livestock, we would not sustain such losses of phosphorus, for, as I say, phosphorus is one of the chief constituents of bone, and when we feed the grain to the livestock and drive it across the mountains to sell in Philadelphia, as my father did in the early days, or drive it down to Cincinnati in the form of hogs, to go from there to feed the slaves in the South, as we did before the War—I remember hog drivers stopping at my father's place before the railroads came, but with the coming of the railroads Ohio became a great livestock growing State, and with every trainload that went out, went a load of phosphorus. Milk is the characteristic food of the young animal and must contain phosphorus, and with the growth of our cities, the production of milk has increased enormously, so there is an enormous stream of this element flowing out of the State, and as far as we have been able to study from these soils scattered over the State, we have not yet found a foot of land in Ohio that has been twenty-five years or more under cultivation, that does not respond to the application of phosphorus; it is naturally the first thing to apply.

Over in Kentucky they have a substratum of rock under their Experiment Station in that famous blue grass region, which you have heard so much about, and unquestionably the notoriety of that region, its great value as a producing country, is largely owing to the fact of this phosphatic stratum underlying it. That region possibly reaches up into southern Ohio. We are finding evidence of more phosphorus in our southwestern Ohio soils than anywhere else, but phosphorus is not the only thing our plants consume; they must have potassium as well, and when we add potassium to our soils, we get a still further increase. When, however, we use potassium alone, though reinforcing it with phosphorus, or when we use potassium and nitrogen together, the yield drops off, and the net value, as shown in the bottom of the table, turns to a minus quantity. In other words, when you use the two elements alone, without the reinforcement of phosphorus, then your result is a loss instead of a gain.

Understand that I am speaking now of the cost of nitrogen and phosphorus and potassium and the ordinary commercial fertilizers, or such carriers as acid phosphate, nitrate of soda and muriate of potash. When we use the three combined, you will notice, the net gain at Wooster is greater than for any single partial application, whereas, in the other cases, you will notice the net gain has been larger when the nitrogen was left out. I want you to notice particularly this, that the total grain from these three elements has been in every case larger than from any other application of fertilizers, but when we come to apply nitrogen and nitrate of soda and potash—muriate of potash—the net gain is smaller in every case except one at Wooster; that means that nitrogen and nitrate of soda cost us too much to be used with economy as the only source of nitrogen for our crops, and potassium in muriate of potash costs us too much to be used as the only source of potash in our crops, but in barnyard manure we have a source of nitrogen and potash which is to be used in such a way as to greatly reduce the cost of these elements ,and in other experiments shown over here we have been doing that.

Now, let us turn to the larger chart (chart shown) and take up some of the points there drawn from our Wooster experiments, which have been longer continued than any except these, and strands of which represent a larger number of the soils of the State. The Strongville experiment seems to represent but a little area, while the Wooster experiment represents a larger area. You will see in the upper line the yield obtained in 18 years, as given on this table, and the annual value of the crop as shown in this column here, that is, in this years' rotation of corn, wheat, oats, clover and timothy sown together. The annual value of the crop has amounted to $10.65 per acre for the 18 years of the test. When we have added phosphate at the rate of the equivalent of 65 lbs. per acre for each of the five years the annual value of the crop has amounted to $14.05 per acre. The cost of the application has been 48 cents annually per acre, leaving us $2.92 per acre as a clear profit from the application. When we have added potash to that, the total value has reached $15.65, raising the net gain to $3.35. When we have added both potash and nitrogen, the total value has risen to $15.80 per acre and the net gain to $3.50. When we have used less nitrate of soda and more phosphorus, the net gain has risen to $4.20. On two plots in this series, we are using yard manure, at the rate of 4 tons each, on corn and wheat, and 8 tons each on corn and wheat in the other, this being ordinary open yard manure after being leached in the barnyard. If we value manure at 50 cents a ton, the manure has given us a net gain of $4.20 per acre from the 4 ton application; and from the 8-ton application, a net gain of $6.43 per acre.

I give you those figures in order to suggest the point that the value which you put upon the manure is an important factor in considering whether or not it is profitable to use it. If you get beyond $2.00 a ton in the valuation of the manure, you can fertilize with chemicals as cheaply or more cheaply than you can with manure, but if you count manure at simply the cost of hauling it from the barnyard to the field, there is no chemical combination that can compete with manure in its value; but I have said that the animals which produce this manure have taken out of the food they consume the phosphorus needed to build up their skeletons, and the result is that this manure is necessarily deficient in phosphorus.

In 1897, we began experiments at the Ohio Station, to study this point in the treatment of manure with phosphorus in the stables. The outcome of these experiments is given in the middle of this chart. You will see that the land without manure fertilizer, in three years' rotation of corn, wheat and clover, has produced an annual increase in total value of $12.35. Compare this with the $10.65 above; in other words, when clover has come in one year in three, instead of one year in five, the net yeild has been worth more than when the clover came oftener; we got $12.35 as the average annual value of the crop in this three-year rotation, where clover was grown every third year, as against $10.65 from a five-year rotation in which we had clover and timothy both, and oats besides, but when this land has been treated with 8 tons of manure applied to corn, the value of the crop has risen to $17.67, as a 14-year average, for open yard manure, given manure at 50 cents a ton, it gives us a net gain of $4.00 per acre in the next column to the last, while with the value of manure at $2.00, you see the net gain has been nothing. I hope I am making this clear.

I am going over it rather hastily and a little roughly, but I want to make that clear, that open yard manure applied at the rate of 8 tons per acre on corn in this three-year rotation of corn, wheat and clover, has given us no clear profit if we value the manure at $2.00 per ton and if we make no allowance to the manure for the effect that must follow on subsequent crops, taking the immediate effect of the manure. I want to impress upon you that the profit from manure depends upon the value you put on it. This is important, because over in our State many farmers are buying manure from town and hauling it out some distance from town, buying stock yard manure and having that shipped and unloading it and hauling it out to their farms. If the total cost of the manure exceeds this amount of $2.00 per ton, judging from these experiments at the Wooster Station, which have been going on now for fourteen years, and which give a larger effect from manure than most other experiments I have been able to find, I say if the manure laid down on your field is costing you more than $2.00 a ton, then begin to think of using either a better grade of manure or substitute fertilizers for the manure; but in these same experiments, we are using 8 tons of stall manure and fresh manure that has not been exposed to the weather, and it has been bringing us a net gain of $6.00 per acre, if valued at 50 cents a ton; or $2.00 per acre, if valued at $2.00 a ton; whereas the open yard manure fails to return any net gain at $2.00 a ton.

A Member: Do you count fresh manure the same as manure kept under a shed?

DR. THORNE: Yes, if it has not been allowed to heat or leach from the weather. Part of this manure has been phosphated in the stable, our rule being to scatter the phosphate, common acid phosphate, over the manure, at the rate of 1 lb. per 1000 lbs., the application being made daily or two or three times a week. There may be better quantities to use, but this is the arbitrary amount we have used, 1 lb. of common acid phosphate per 1000 lbs. animal per day. That has been our rule. We think a little more would be better. We are using acid treated manures and the raw flux, and both are giving us equivalent effects when used in this way in the stable, the same quantities.

A Member: For what purpose do you use that?

DR. THORNE: The object is twofold; it is, first, to reinforce the manure with phosphorus; for that purpose, either the raw rock or acid phosphate would seem to be equally useful. It is, second, to prevent the escape of ammonia; the sulphuric acid in the acid phosphate is the effective agent. We apply it for the conservation of ammonia and the reinforcemnt of phosphoric acid with phosphorus. The acidulated phosphoric acid will retain the ammonia better than the raw rock. We are using common gypsum in these experiments and it improves the manure enough to pay well for its cost, but it contains no phosphorus. We find that we get enough larger increase from using the phosphatic materials to make it unprofitable to use the gypsum even as a gift.

A Member: Does that improve the condition of the atmosphere?

DR. THORNE: We think so. I use it in my horse stable for that purpose. Another effect that the acid phosphate has that neither the floats nor the gypsum would have, or at least the floats would not have it, is that it reduces the fly nuisance. We are not yet able to say that we can control the fly nuisance by this treatment, but we are confident that it materially reduces the breeding of flies. We are confident that if we used more of it we could completely control the fly nuisance. A daily use of acid phosphate in the stables at a rate larger than I am speaking of would unquestionably reduce the fly nuisance.

A Member: Do I understand you correctly that you stated that twenty-five cents' worth of phosphoric acid to a ton of manure increased the value of the manure $9.68.

DR THORNE: Well, right here are the figures. You saw the stall manure phosphated has made a total increase to the value of $25.65, 8 tons of it, while the stall manure without the phosphorus has made an increase of $19.70; there is a difference of $5.00 for 8 tons of manure. Now, taking out the cost of treatment in both cases, the net gain is $6.02 for the stall manure without the phosphate and $10.17 for the stall manure with the phosphate; there is $4.00 for 8 tons of manure.

A Member: How is that, Doctor?

DR. THORNE: My own figures are a little confusing on that point right here. This is the net annual gain from 8 tons of manure distributed over three crops; the total gain from the 8 tons of manure would be three times as much as the difference between these figures; it would be $12.00 from the 8 tons of manure, which would be practically $1.50 a ton.

A Member: Is there any danger in using that acid?

DR THORNE: None whatever; on the contrary, we think it would be an advantage to the animals.

The SECRETARY: Let me suggest that those who ask questions speak loud enough to be heard by the reporter.

DR. THORNE: The question was whether there would be any danger to the animals, especially the animals' feet, from using acid phosphate. We have discovered no danger. We think the use of acid phosphate, especially in a horse stable, will be an advantage to the animals' eyes. I have seen horses' eyes injured where the ammonia was not allowed to escape and acid phosphate will reduce that injury.

PROF. MENGES: You say that unacidulated rock has the same effect?

DR. THORNE: No, it would not have the same effect in arresting ammonia.

The SECRETARY: The person who asks a question should speak out. Just forget for the time being that you are talking to Dr. Thorne and suppose that you are talking to somebody with his back toward you. After this meeting is over, we want this literature to go all over the State, and in order that everything shall be in proper condition, so that the reader can understand it, we want the question as well as the answer.

DR. THORNE: The question is whether raw rock would have the same effect in horse stables as the acid phosphate. Now that question we have put to a comparative test. The experiment described here has been made on cattle manure, which does not ferment so rapidly as horse manure, and we interpret our experiment as meaning this, probably, that for slow fermentation manures, where the main object is the reinforcement of the manures with phosphorus, that the raw rock will produce practically the same net effect as the acid phosphate. It does not produce as large a total effect, but it does not cost as much per ton; but the same amount of money expended in raw rock as in acid phosphate will produce practically the same amount of net gain as in acid phosphate; not in the case of cold manures, but in the case of stables which must be cleaned daily or in the case of horse stables; our reasoning is as the general outcome of our experiments, that the acid phosphate is the logical material to use, because of its greater effect in the arresting of escaping ammonia. It will make the stable sweeter than the floats will. It will do more to prevent the breeding of flies; it will catch more ammonia and hold it; it will reduce the fermentation and the heat to a greater extent than would the floats, so that our recommendation practically is to use the raw rock. The floats under steers or sheep that are being fed continuously, where the manure is trampled under foot and allowed to lie some weeks before it goes to the field, there the float has a long time in which to be acted upon by the manure and the results we are getting are very satisfactory, but for manure that must be handled daily our advice is to use the acid phosphate rather than the floats, believing that the outcome will be more satisfactory from the acid phosphate than the floats.

A Member: How often do you use it a week in a horse stable?

DR. THORNE: It is apt to be used daily in a horse stable. We do not, all of us, carry that out, but it ought to be used daily in a horse stable.

A Member: Is there any difference in the value of using it in the horse and cow stable?

DR. THORNE: We have not investigated, but I assume it would be even greater in the horse stable than in the cow stable, especially as to flies and the saving of ammonia.

A Member: If I understand you right, an investment of 25 cents brings a man $1.50?

DR. THORNE: That is correct.

MR. HULL: If the horse manure from horse stables is put into the gutter in the rear of the dairy herd, won't the cow manure arrest the escape of the ammonia;

DR. THORNE: To some extent it will, but if allowed to lie for any length of time, fermentation will set in and the ammonia will escape; therefore, we would even then recommend acid phosphate to arrest the escape of ammonia; the immediate escape of ammonia will be retarded, but eventually there will be an even greater loss than if the two were not mixed.

MR. HULL: When the horse manure is put out of the stable, the decomposition would be delayed?

DR. THORNE: Yes, but cow manure will set up fermentation after a while. It is simply slower in its fermentation than horse manure, and the incorporation of this material with that mixture will still further delay the fermentation more than if the phosphate is left out, but don't forget, after all, that the effect of this addition of phosphate is not merely to arrest fermentation, it is not merely to reduce the fly nuisance, but it is also, and that was the first object had in view, it is also to reinforce the manure in this element of phosphorus in which it is defective, and that is largely why we get the results we have.

Now the floats, so far as we know, the floats doesn't arrest any ammonia, or but very little, but it does reinforce the manure with phosphorus, and in our experiments, the floats is giving us in the field nearly the same effect we get from acid phosphate. If you figure experiments one way, it seems that the float is the more profitable to use on cold manure than acid phosphate, but there are three objects to be held in mind all the time, reinforcing the manure with phosphorus, the arrest of ammonia and the abating of the fly nuisance. Those three objects are all to be considered in this treatment.

MR. WELD: Here's one question; Why does it abate the fly nuisance?

DR. THORNE: Because the flies will not breed in manure where sulphuric acid is used.

MR. WELD: It destroys their eggs?

DR. THORNE: Yes, sir.

A Member: Suppose the manure is used every day from the stable; will it be as effective then?

DR. THORNE: It would be as effective in reinforcing it with phosphorus, it would be as effective in arresting ammonia, even more so; and as the fly nuisance, there would be the same thing to say. We think the acid phosphate would have just as large an effect in that case as where the manure is trampled under foot. Now your suggestion again is where manure is handled every day, whether horse or cow manure, where it is handled every day and dusted with phosphate at the time of handling, in order to reinforce it with phosphorus, in order to retard the escape of ammonia and in order to reduce the fly nuisance, but if allowed to lie under foot and be trampled for a period of time, then the float will perhaps be the best material to use. You can only purchase the floats to advantage in carloads, whereas you can get acid phosphate in any quantity you please, and the floats now are not on the market in smaller quantities than carloads, except at a prohibitive price. If you have to pay a high price, by all means buy acid phosphate.

Now the question whether all this work is of any avail depends upon whether the common farmer can apply it to his operations. As we have taken the farmers through our experiment fields, we have heard them saying: "Yes, you can do this because you have the State behind you, but we cannot afford to do it on our farms." They have said this with regard to all our work, and especially this work in the reinforcement of manure. The question came to us, and as I said this morning, we had on the Station farm a tract of forty acres that had been under a four-year rotation of corn, wheat, oats and clover for ten years past. This was in 1904. In this four-year rotation, the manure being applied from the barnyard, where it had lain exposed to the weather, at the rate of 8 or 10 tons to the acre, spread broadcast over the wheat before seeding, after ploughing in the oat stubble for wheat, our yield for ten years had been an average of 48 bushels of corn, 50 bushels of oats, 20 bushels of wheat and about a ton and three-quarters of clover hay.

We decided to test for our own Station whether these tests we had been studying—we had nearly a thousand of them—we had more than fifteen hundred—now these plots—I started to answer a different question—are distributed over different soil types. We wanted to see whether the results we were getting on these small plots running from 1-20th up to 1-10th of an acre each, were applicable to ordinary field conditions, so in 1904 we changed our system in this forty acre field and instead of letting the manure lie in the barnyard from spring until August, we put it directly on the land, after taking off the second crop of clover, on that clover field that was to be ploughed for corn next Spring, and instead of putting it through the barnyard we took it from the manure shed or stable direct and spread it over this field after having treated it with this phosphate material, treated it with floats in the stable or in the manure shed and then taken to the field and spread during the fall and early winter broadcast over the land with a manure spreader. Of course, at the same rate we had been previously using 8 or 10 tons at a ploughing under with corn; we had learned that we must lime that land before we could grow clover successfully; therefore, after ploughing under the manure we applied lime at the rate of a ton of burnt lime or two tons of brown limestone to the acre, and we have never been able to discover any practical difference between the two when applied in those proportions, because when you burn a ton of limestone you burn out half its weight, so you have the same amount of calcium in it as in the original stone. The corn was followed by the oats in regular system, the oats receiving no treatment. On the wheat we used a high grade complete commercial fertilizer, using 400 lbs. per acre of 4-16, 4-4 fertilizer.

The result has been that since this change was made our corn has averaged 73 bushels to the acre, instead of 48; our oats has risen from 50 to 60 bushels, our wheat from 20 to 33 bushels, our clover from 1 3-4 tons to over 3 tons per acre, and we would have had an average of considerably more if we had not, a time or two, bought common medium red and got Mammoth. The Mammoth gave us only one cutting and that no heavier than from the medium red, so it cut down our yeild considerably. Last Fall, from 10 acres of medium clover we harvested from the two cuttings 4 3-4 tons per acre on land that ten years ago was refusing to grow clover at all. The result has been an increase of about 25 bushels of corn to the acre; my figures would make it 26, the manure being the same as it was before; the phosphating of the manure cost us $1.60 an acre; the lime was figured at $6.00 the first time and half that since. The complete fertilizer we used cost $6.40 more, making $14. an acre. That we have paid out to get back 25 bushels of corn, 10 bushels of oats, 13 bushels of wheat and 1 1-4 tons of hay.

Have we come out or not? Is it a rich man's proposition or a poor man's proposition to treat land in this way? That is the question. I say if there is any man under heaven who can afford to neglect the use of manures and fertilizers, it is the rich man. The poor man is the last man under God's heaven who can afford to neglect these propositions.

The **SECRETARY**: Doctor, I thought you were going to give us in your figures the difference between manure spread as it comes from the stable after harvest on the ground that you are going to turn down for corn, and that taken up in the spring.

**DR. THORNE**: No, I cannot give that in exact figures. We have observed this, that the manure we first put on is the manure that gives you the largest crop and our farmers who are following the same practice corroborate us in that, but cannot give us any exact figures.

**A Member**: That which you manure in July is better for corn the next year?

DR. THORNE: Decidedly. We depend on eye evidence alone, but the eye evidence has been strong enough to make us safe in this assertion.

A Member: When you put the manure on, do you then cut the second crop.

DR. THORNE: We usually wait until after we have cut the second crop. If there isn't going to be any second crop, we would put it on after the first mowing, but usually we wait and take a second cutting.

A Member: That second crop, do you use it for hay or clover seed?

DR. THORNE: We have thus far used it for hay. There have been reasons for not using it for seed. In some cases we have not had the seed.

A Member: Does it make good hay?

DR. THORNE: Some of the best hay I have ever fed to my horses was second crop clover that I cut last fall.

A Member: Does it make them slobber?

DR. THORNE: Not a bit. They would leave their oats for this clover. There was a good deal of ousack in the first crop and a little in the second. It all depends, in our judgment, on the way it is handled.

A Member: Tell us how to handle it, because in Pennsylvania we have trouble with that.

DR. THORNE: You will have to govern the weather before we can tell you absolutely how to handle it; there is the point, it is a matter of weather and not of particular handling with us.

The SECRETARY: Or shop covers.

DR. THORNE: Yes, these shop covers are invaluable if you are growing alfalfa and very valuable for clover hay. I thank you for your attention.

The CHAIRMAN: This closes the program; are there any announcements?

(Director Martin called attention to the Evening Session and read the program for same).

DIRECTOR MARTIN: This is an important session, one in which both persons living in the city and the country are unquestionably interested. We shall hope and expect a full audience for this Evening Session at half past seven.

The SECRETARY: Before we adjourn, with Mr. Martin's consent, I would like to make a suggestion. I notice that some of the members, when they are asked questions, will move from one place to another, and I see that the reporter has some trouble in following after you, in order to put himself in a position where he can hear all that is going on. Now, if it be agreeable, I would like to suggest that the speakers will stay right in their places, then the reporter can get near and put himself in a position so that he can hear the questions and the answers. I think it will make our report more complete. Excuse me for interrupting.

**MR. MARTIN:** That's a good suggestion. Usually, at a meeting of this kind and character, where there is a call for a Committee on Resolutions, as has been our custom, we will appoint three gentlemen who will compose this Committee: Prof. Menges, of York; Mr. Schultz, of Montgomery, and Dr. Conard, of Chester, who will compose this Committee on Resolutions.

**The CHAIRMAN:** Before adjourning, ladies and gentlemen, when you have the time, we wish you to visit as much of this little city as you can, especially our temple of justice, and in that Court House, on the third floor, you will find a collection of the Washington County Historical Society. About the only time you can get in there, I presume, would be in the morning before the convening of the sessions here, or at the noon hour. I think there is a lady in attendance there all the time to show you around. I don't know when this is closed, but I wish you all to take a view of that. It is on the third floor of the Court House. We now stand adjourned until 7:30 this evening.

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Tuesday Evening, May 20, 1913, 7.30. P. M.

## WOMEN'S SESSION

Mrs. Martha E. Martin, President, in the Chair.

**The CHAIRMAN:** This is the first time that I remember that the Ladies' Session came in the forepart of the week's meetings, and I think it is nothing but right that Mr. Martin put us forward and had our session come earlier. I never attended any of the sessions in the General Assembly when they were voting on any of the questions of Woman Suffrage, and am not quite in sympathy with them, but I do feel there is one thing that the men can do alone without the ladies, and that is to vote. The first subject on our program this evening is "The Farm House," by Mrs. Mary T. Monroe, of Dryden, New York.

Mrs. Monroe spoke as follows:

## THE FARM HOUSE

By MRS. MARY T. MONROE, *Dryden, N. Y.*

As I listened this afternoon to facts about counties in Pennsylvania, I learned that Lancaster was the best county in the State, that Washington was the best county in the State, that York was the best county in the State, and I presume, that if there had been more speakers from different counties, there would have been other best counties in the State and in the world. I was reminded of what Dean Cook once said—you know he has been here talking at Institutes, he is at the head of one of the Agricultural schools in New York State, the one at Canton, and he said he liked to hear a man stand up for his own state and stand up for his own county and stand up for his own family and stand up for his own wife, even if he had to lie just a little bit to do it. And so I was glad to hear the remarks of the various speakers, and, as I listened further, do you know I made up my mind that those wonderful tales were true, which is the worst of it, and I thought of what Mark Twain said: He said that he had an awful dream one night, a terrible dream, his hair stood on end and cold chills went up and down his back, and he dreamed that his wife was pounding him over the head with a pillow and he got more frightened, and finally after one energetic whack, he awoke and found it was true. And so I thought probably these stories were all true—the worst of it was, they were true.

I want to call your attention to-night to a new factor in the Farmers' Institute work and get you to thinking about it in a new way, and I refer to the farmers' house, the farm residence. We have been giving a new kind of attention for many years to schoolhouses and we have better buildings. We have been giving a new kind of attention to churches and we have better churches, I suppose, better ventilation, better air. We have improved highways, even in New York State. We have improved means of communication all over the country, but very little has been done to improve the farmer's house, itself. Too many farm houses are poorly equipped for doing the work that has to be done in them. All hotels seek for labor-saving devices to lessen the work, to save strength and in this way to save money. The farmer himself buys improved machinery and performs his work by new methods in order to save time and save in that way, money.

In a little village in New York State—I don't know whether you can see it in Pennsylvania or not, I have seen the Standard Oil wagons going around drawn by two or sometimes four great horses delivering oil, and I said to myself and to a friend, "Why don't they carry that on the railroad or by other communications between these villages?" And do you know I found that the Standard Oil Company could save a few cents by delivering their oil by teams rather than on the railroad. Well, now, if it were worth while for the Standard Oil Company to save, it is worth while for the farmer to save money by having new and improved methods of doing the work in his own house. I think in time and strength the greatest leak is found in our homes and the lack of these labor saving devices keeps a woman trudging around a house day in and day out doing work that she might accomplish very quickly if she had the proper machinery to save her time for life in the open.

Farming is getting to be looked upon as a business system. We have had up to now business men and farmers—not the same thing at all; but farming now is a business and like any other business, it has a center. Now the center of the farming business is the farm residence, and when we strike at the farm home, the farm house, we strike at the very center of our rural life, and it is just as much a problem to reorganize the house itself as it is to reorganize the farm itself. I think men are as much interested in the carrying out of the operations of household labor as are the women. They ought to be, because they have to pay the bills, generally, and they are generally willing to add to the comfort of the house and the beauty of it as well as its cares.

There was a suffragette, that made an arrangement with her husband that she should attend whatever business he had once a week and he should stay at home and take care of he children and mind the house. Well, the first time she went to this meeting, whatever it was, he staid home willingly, but she was very anxious and hurried home from the meeting and John met her at the door. She said, "How did it go? Did you have any trouble with the children? Did you get them to bed all right? Did you have any trouble with them?" "Oh, no," he replied, "that little red headed boy did bother me a little, and finally I had to shut him up in the bedroom before he'd go to sleep, but it's all right now." "But John, we haven't got any red-headed child; that's Willie Smith, from next door."

It is time for men to commence to take some little thought of the inside of their houses. The farm houses in New York, and I fancy, Pennsylvania, were built a good many years ago, and the older ones were adapted to a kind of farming that is rapidly going out of fashion. Many of our older houses in New York State are gradually tumbling to pieces. Of course many farm houses are all that could be expected or could be desired; but within forty years most of the old farm houses must be either torn down and re-built or remodeled, and it is very important that when we do remodel our farm houses, that we do not follow the old lines of construction. I do not mean that a farmer must remodel his farm house until he can afford it, but my point is that as fast as the farm houses are reconstructed or re-built, certain new features shall be incorporated in them. I do not mean, either, that the farmer must build expensively, a cheap house may serve its purpose in the class to which it belongs just as well as an expensive one, but I do think that when you make it over, it is just as easy to make it convenient.

A familiar type of house, I think, to most of us, is the long upright with a wing, the kitchen at one end and the living room at the farther end, with perhaps a cellar. The kitchen is the only part of such a house that is warm in winter, so that the living is nearly all concentrated in the kitchen or one or two rooms adjoining it, and a rambling type of house lacks the concentration necessary in the middle-class house of the present day. There are several things that make it necessary to change the style of the house. One of these is the introduction in our farm houses of water works, and another is the difficulty, in New York State at least, of securing household help— we cannot get any in New York. Another is the expense of heating; that doesn't apply here very much, because you have coal oil and hot air. Many other changes are noticeable. One is the removal of the carrying of the milk from a house, so that makes a great change and a new type of house is quite as essential as the house itself. Of course the type needs as much remodeling as the farm house.

There has been a tendency in recent years when city men come out and go to farming, to build a farm house of the same style as the city house, a house that is very narrow and high. In the city this is a necessity, but it is very awkward and unsightly in the open country and entails much unnecessary running up and down stairs.

Now you see we might profitably change the type of our farm houses. Everything changes. A man who was a farmer was asked by one of you Institute men why he did not change his method of farming. He said, "My method of farming is good enough for me; that's the way my father and my grandfather farmed." "Well, if your father was a Democrat, would you be a Democrat?" "Yes, I'd be a Democrat." "If your father was a thief, what would you be?" "I'd be a Republican."

Now, by way of getting this before us, I will make a few concrete suggestions, and these suggestions will apply to common farm houses rather than the estates of country gentlemen. A farm residence should fit the farm. Country land is cheap—well, not on Long Island, I will except Long Island. Household labor is very high priced and hard to get. The house should be broad and,long rather than narrow and tall. We need a type of farm architecture that seems to grow out of farming conditions; that is, the farm house must look like a farm house, not like a city house. It should be very simple in its construction and plans. This is true of all houses, but particularly of country houses. The farm house should be condensed as possible and the house should be ,on this account, planned to save to the very utmost. It must be remembered that a farm residence is a working place, and the kitchen and dining room and wood shed and cellar should all be within reach of one another, and so far as possible those rooms which are daily used, together, should be on the same floor and without any step up or down between them. This saves very much time and strength on the part of the house-wife.

We have not appreciated in the past that women's steps mean a loss of strength, and, therefore loss of money, and we should, therefore, plan our house so that the women's steps will be saved for other activities than just simply the drudgery of housework. How many do you suppose a woman takes in preparing a meal for a good sized family, four or five? that's a good big family in these days. Considering that 5,280 feet make a mile and that a woman prepares about a thousand meals a year, wouldn't you nearly circumnavigate the globe? And I think she'd have a lot better time. There's a whole lot of things a woman can have in an ordinary kitchen that she can make herself or that her husband or brother can make for her. They won't cost much and will be a pleasure to her.

This question of money in the house is a serious one. Do you know I think there's hardly a man here that realizes how badly a woman needs money, and I don't think one of you know what she does with it. Do you know there were two men that were bachelors and they were great friends. One of them got married and the first time they met after Mike was married, Bill says: "Mike, how do you like being married?" "Oh," says Mike, "I don't like it, I don't like it at all." "Why not?" "Oh, it's my wife; she wants money in the morning and money at noon and money at night; it's money, money, money." "What does she do with all this money?" "I don't know," says Mike, "I aint give her none yet."

Now the simplest thing, first, I think of, is a high stool on which a woman can sit and do a good deal of household work, wash dishes and peel potatoes at the kitchen sink and do a whole lot of things. Another thing is a hinge shelf near the kitchen sink, one that drops down out of place when not in use. Some houses might have a dumb waiter or, in the pantry, a shelf. If there is a cellar under the pantry, a shelf with the bottom taken out and wire meash put in for the bottom of the shelf right over the cellar. That makes a cold box. On the same line, another convenience is a window cupboard, if you can spare a window, take it for a window cupboard on the outside of your house. Put a dry goods box on brackets, make it the color of your house and have it the size of the lower sash. Put some wire screen over it for ventilation and have some shelves in it. I could make it myself with a stone for a hammer and any old bent nails. I can do good work with a stone and bent nails, and if you have that window cupboard, when you have a few things left over to be used for the next meal, a pitcher of cream to go on the table again, or a plate of butter that has not been mussed, tuck it in there. Draw a little curtain over the lower sash to hide it from the inside of your kitchen.

Many farmers buy supplies in large quantities, a barrel of sugar, a barrel of flour, and they are very hard things to move and sweep under; have a little platform with castors on it, such as they move stoves on in hardware houses—any man can make that, I am sure and put your barrel on that little platform and it can be moved from point to point. A zinc covered table is a splendid thing and you can cut down on a piece of zinc with a good sharp knife and it won't dull it much, not as much as to cut on wood. A zinc covered table can be made by any handy man and used to advantage in most of our kitchens. Then another thing—a clock in the kitchen is a great convenience. There is one thing about it—I hope that no matter what time the other clocks in the house may be, you will always set you kitchen clock exactly with your husband's watch. It might happen to be right, you know, but anyway, keep it with his watch, it will save you a lot of trouble. Another thing—a pair of scissors in the kitchen to cut salads and bacon rind and everything, and have such a handy place to put them that anyone would rather put them there than anywhere else. Another thing is a fireless cooker. For fifteen years I have used one that I made myself, and it is about as convenient and saved as much heat and steam and fuss about my kitchen as any other thing I could mention.

Well, with all those things in mind, a house then should be planned so it can be easily cleaned. That means an absence of all filigree work and jim-cracks and spindle work and upholstered furniture and hangings and curtains of various kinds and useless furnishings and eccentric corners. Did you ever see a den in the house? How many houses do you know that have what is called a den? Haven't you, in your own house, a den? What is a den? A den is where the broken chairs, the rugs with holes, the pictures cracked, the table packed, a tickless clock, desk that won't lock, are gathered in a heap by Ma and put into a room for Pa. That's about what the den is in our house, too.

Now that we are appreciating the relations between health and dust, the germs that lurk in dust, we feel differently about the construction and furnishings of our houses. We use now a liquid to dust with. You can make your own, make a preparation yourself, that will be cheap and handy and I really think works better than the bottled preparation. The one I use I adapted—I won't say I stole it, but I accidentally got hold of it from a man who tuned my piano and he always left it in such fine shape after he tuned it, those little finger marks all rubbed off, and I found out what it was, it was equal parts of sweet oil and turpentine and alcohol and water, a tablespoonful of each. Keep it well shaken up; just take a little cloth you can hold in your hand, not much larger than your hand, and saturate it with this preparation so it won't leave streaks when you wipe off your furniture, and it is splendid.

Another thing is a crack filler. So many houses might be easier cared for if the carpets were taken up and taken out of the houses, but those ugly cracks! There are cracks in the floors of the old farm house I went into when I was married, as thick as my hand. I used to make a crack filler that was very hard work; I boiled newspapers in paste,—it took a long while—with a little alum in it. but I discarded that. At one time I was in Waverly, New York State, and after I had told them how to make this complicated crack filler, a man got up and said, "I know how to make a better one." I asked him to tell me how and he did it. He said that when he built a house, if there were any cracks that needed filling, he took some Binghampton plaster, a fiber plaster, and wet it with water and spread it in the cracks, and I said, "How long will this last?" He replied, "Oh, it will last till I get off the job." But now I have a better one than that even and that is the simplest, and do you know when you get down to one that really works, it is always one that is very simple? Take some flour paste, flour boiled in water, and thicken it with plaster of Paris. Don't do very much at a time, because the plaster Paris hardens. That can be spread in any broken place on the plastering. You know when you tear off the old paper how many holes develop around where the rockers and chairs have gouged out the plaster and where the door knobs went in the wall. Just fill in those places with these materials, and it is just as nice and will save you the expense of getting a plasterer there.

Now friends, that house could be re-modeled with an idea of applying power to some part for the household work. There are many little engines on the market that generate power. There is one, I cannot remember the name of it, that can be used to pump the water, to churn, to separate the milk, to run the washing machine or the ironing concern. It has a generator that generates enough electricity so that twenty lights will burn in the hose for eighteen hours. That is a very common thing now and it is very handy. I was at a farm not long ago where the man was boasting of his conveniences at the barn. He had an engine going to pump the water for his cows and horses and pigs. He was feeling very lofty because he was going to get a bigger engine and do the same thing for his children. Do you know that was poor business. That man had to sell his little engine because it was not large enough to pump the water and do the work for the barn. He had to sell that engine at a loss. If he had borrowed money and paid interest on it and brought an engine of the right size in the first place, he would be money ahead; but I am glad he is going to pump it up into the house, anyway. We have been applying power to the operations of the farm work at the barn for a long time ,but not to any great extent in the house. Every modern house ought to have water running in it and out of it and I hope that within twenty-five years all of our better farm residences and may of our tenant houses will have better water facilities, and it seems to me that as long as the farmer can secure his water without a water tax or without being subject to a water board as they have in town, he ought to control the situation very much as he wishes. Of course in some farm houses it would be possible to get a supply for the house by having your system at the top of your house, but will you tell me where the advantage is in letting rain water down into a tank at the bottom of the house and then pumping it up again into a tank at the top of a house? Why not let it run into a tank at the top of the house in the first place and then distribute it? It will be just as good water.

When we have water in a house, we can put in some system of sewerage. There are many tanks costing about five dollars that will actually take care of all the waste of the farmer's house, allow him to have a bath room, inside toilet room and water at the kitchen sink at low expense, if he can get the water in the house.

The ordinary farm house further should be planned in such a way that the members of the family can do the house work, not depend on servants, and I am not sure that in many cases it will be possible to reduce the housekeeping labor by a quarter, perhaps a third, if the plan is studied with that view in mind. Do you know that most of the unexpected visitors come to the side door or the back door, because the woman and others are at work in the rear of the house? There may be no servant, and it seems to me that our secondary and back doors should be much more attractive than at present, and that will result in a house that is attractive all the way around. I think it will come to mean that when we can do away with this old outside closet, disfiguring, unsightly, unsanitary and many of the old buildings and sheds that have come later—it will mean that the back of our house is as highly developed as the front or it will face all ways and have no back yard. The house ought to be provided with ample storing facilities. Very often large quantities of various things are put down for winter. Many times this place might be better on the first floor. Ordinary they are kept in the cellar or in the garret, and this place also should be large enough to keep not only the fruits and vegetables and other supplies to be sold, but the jellies and pickles and other supplies of the house. In this day of woman's work, so many farmer's daughters are making jellies and jams and pickles and one thing and another to sell and have a nice tidy sum in the bank to show after it, and such a storeroom would be very nice for that.

The first floor and the cellar are the center of the family's activities. The members of the family spend much of their time out of doors, and this means that the first floor should not be approached by a high flight of steps, and also that the wash room and other service rooms should be on this floor and of easy access and preferably near the farm side entrance so that the men from the farm will not be obliged to run through the house in order to reach their conveniences. When additions are placed on the old farm house, care should be taken to make them match in appearance and style the original house. It is very common to find box corniced houses with queer looking porches on them, chicken leg style and with queer jim-cracks, even if the original house was a dignified sort of a house. These, if left to the whim of the ordinary carpenter, are apt to look unsuitable and jimcrack work on the outside of a house is poor policy, because it is the first thing to go to pieces, and when you come to paint it, it takes more paint and more time to put the paint on, and when it gets shabby, it does look very much worse.

I want you to think about this change in the farm house. I don't expect it will come at once or for sometime, but get a new picture of home in your mind; a building stands not a day, but year in and year out, and its influence is greater than any of us is aware of. A house is built of bricks and stones, of wood and beams and piers; a home is built of loving deeds that last a thousand years. A house, though but a humble cot, within its walls may hold a home of priceless beauty, rich in love's eternal gold. The men of earth build homes with pillars, walls and domes; the women of the earth, God knows the women build the home.

The CHAIRMAN: Next on the program is Dr. A. Holmes, Dean of the General Faculty, State College, Pa., who will speak on "The Country Boy." It is reported that he has not arrived. The next subject will be "Home Making a Science" by Dr. Hannah McK Lyons.

Dr. Lyons delivered the following address:

## HOME MAKING A SCIENCE

By **DR. HANNAH McK. LYONS**, *Ceres, Pennsylvania Grange, Lincoln University, Pa.*

I suppose we have no object before us greater than home making, and when we begin to put the two together, home making and science, we wonder if they do really fit together, and I don't believe there's a home maker in Pennsylvania—well, perhaps there may be some who are in the Grange and are getting up to date, but I wonder if there are very many home makers in Pennsylvania who believe that any science belongs with their home making. In the old days you went to a temperance meeting and you heard a great many things; but today you don't hear the same things, you hear the scientific side of the subject and you stand aghast at the truths that are told you. Again, the mother sends her boy to College, and, to the inquiring neighbor who asks after him, as she throws her head up a little and her shoulders straighten, she says, "Yes, Thomas is having the Scientific course at College," and then in a few moments she turns to her kitchen and the droop comes again to her shoulders and she goes about her work and says, "It's drudgery for me; my boy may have science, but it's just drudgery at home." Never for a moment does she realize that she has the greatest laboratory in the country in her own home, in her own kitchen. Recently I heard an educator say, one of our prominent ones in Pennsylvania, that the greatest thing in this country was education, and then he went on to say that the schools were the most important and so on.

Great as I believe our schools are, and I grant him all he said, at the same time, ahead of that I would put the home and the home makers of our State—yes, of our country. You notice that I have not said the housekeepers. I believe there is a great difference between the housekeeper and the home maker, and yet the homemaker is always a good housekeeper: You have seen just as I have seen, and I well remember in my first days away from home, when I was out in the business world, as you would say, and I was boarding, how the husband came into the kitchen and the dining room, but he had to be careful how he sat down in the parlor, and the young boy just coming into his teens—and how my heart has gone out again and again to that boy who became a little wayward, yes, a little more than a little—he didn't dare come in the parlor; and so I would not have my homemaker the kind of a housekeeper that James Whitcomb Riley tells us about, who believed that she was entirely right with her neatness and her overcarefulness, and yet her husband found the old balky horse at the stable and the old cat better company that his wife; and so I would not have our homemaker that kind of a housekeeper.

Today home making is becoming complicated, more complicated than it ever has been. In the great business world they have planned their systems of transportation until foods from all over the world are brought in our markets at home. And what is true of the foods is true also of the fabrics that we use for clothing, and so I say home making today is more complicated that it was in the old days when, from the farm and garden, the table was supplied. It was an entirely different task to prepare them; it was entirely a different task to dress the family when the hand loom furnished all the clothing for the home and the styles of this year were the styles of next year. But today, with the numerous fabrics coming, our home dress maker has to determine which is best for her family, and just as we heard this evening, the house that is fit for the city is not the house for the farm, so the clothing that is worn in the cities is not the clothing for the country. Just the other day a friend was talking to me, telling me of a Vassar graduate who had come into our county and I had heard her spoken of in regard to some work and then we thought she was not succeeding and my friend said: "Yes, but do you know what she it doing? She's a pastor's wife; she has a large class of girls in her school, a school gathered up from a country district; she not only teaches them the lesson on Sunday morning, but she is teaching those girls how to dress in the country, teaching them the proper thing to wear and the proper way to wear it."

But I was speaking of food. It is a task today to go into the market and choose your foods, choose the thing that is suitable for your family, so that you will have your meal well balanced, so that you have nutritious food, at the same time that you have a variety and so that it is pleasing in appearance, because they tell us that the pleasing part is an appetizer. When our housewife undertakes to

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plan her meal, does she realize that then her science is coming play? Well, ask her where. She can't understand; she doesn't understand, herself. I have thought sometimes when we served our meat and potatoes together and when we looked back and realized that our grandmothers served the same things together and when we know, those of us who are studying these questions, that meat alone does not give the proper food value, and that potatoes alone does not give the proper food value, but that we combine them and nearly always serve them together, I think there must have been a blind instinct in the early days for serving those two and serving many other of our foods together. But today our scientific housekeeper knows why she serves them together, and I believe if our girls could be taught to know a little of the why and wherefore of these things, why they serve such and such things together, why they cook them so and so, why boiling water goes on a cereal, or why cold water goes on something else, that we would find that more of our girls would stay at home and be home-makers and help in the home rather than by going out into the business world, which, after all, they tire of after a little while. When our housekeeper understands that she applies heat to this because she is going to get more food value and more nutrition out of it, that she applies cold to something else because she will make it more appetizing and gain a greater food value, then I believe will she begin to learn the value of herself and her work and not feel the drudgery that she has.

I think if there is one thing the Grange is doing—and I can't leave the Grange out always in this home making— I believe if there is one thing the Grange is doing more than another, it is helping the women of our country find themselves. The farmer—a long time ago a great many things were done for him. He must be taught to raise better crops; he was the head of the home and the money maker. But we know today that the wife is the money maker just as much as the farmer is the money maker. If she doesn't plow the field and harvest the crop, she produces the meal that brings efficiency, and she saves the money in the home. When she prepares a meal that gives nutrition, that gives working power when he goes out to his work and finds that he has the strength and the ability to work, that his brain is clear and his nerves quiet and not all on a go, as I heard someone say not long ago, because his dinner was not digested right, that man is better able for his work, better able to cope with the business world, and so I want to ask you if that well prepared meal is not a financial asset in the home, and if she knows more of scientific methods that will make the meal more scientific. I don't mean, when I say scientific, that little poem that the boys give us sometimes about scientific cooking, but I mean the real, real, science, when she brings in the food nutritious as well as looking all right.

Then again when our purses are so light, if she knows how to substitute when eggs and meat and various things in the market are at the very highest price, if she knows the things to substitute and yet keep up nutrition, yet keep up her balance that she needs on her table, when she knows how to cook the cheaper cuts of meat and make them just as nutritious and palatable as a Porterhouse steak, is that not a financial asset? About this time of year, well, during

April and May down in our part of the State, we have the Susquehanna herring and we think, as they come along at this time of the year, they are somewhat of a delicacy, and about a year ago I remember our women had a very practical lesson, a sad one, on combinations. Sickness came in one of the homes. A boy—oh, you know boys when they get just to the age when appetite demands a quantity of everything, and this boy had eaten his supper and was taken very sick. The physician was called. He was very ill indeed; in fact, death was the result. A little later the old physician who attended him said, and it just leaked out all over the neighborhood, that it was fish and milk for supper. Now I have thought about that. You know sometimes we prepare fish with milk, but just note it is the kind of fish and that herring and milk don't go very well together, and so today, if you come into that section of the country, you will find that a mother never, when herring is her supper dish, permits her children to have milk also in quantities, and it is important to see that she knew these things.

I said a while ago that our home making was becoming more complicated, and if it is becoming more complicated, of course she needs more knowledge. But you say she is at the age when she cannot go to school. No, but her daughters may; and I would like to bring the message to you tonight that, if you have a daughter, let her have domestic science (shall we call it?) and I wonder if one of you, as you send your daughter off for domestic science, will straighten up and say with pride, "Mary is having a course in domestic science," as you said sometime ago when your neighbor inquired about Edward and you answered, "Yes, Edward is taking the scientific course." I have heard, I think I could count on my fingers, the mothers who have said, "Yes, we are letting Mary have a course in domestic science;" and then, in a half apology, she tells you why. I want to ask you, why not give her the scientific course in home making? Now, domestic science does not mean just cooking. Let us get away from that. Why not give her a course in scientific home making? You give her a course in music; she must have that. You say, "Yes, but I can teach her all the home making she needs at home. I can cook a meal fit for my people to eat, fit for anyone to eat and can teach her to do it." But I am afraid that many times you teach her the drudgery side of it and not the side that gives the uplift. And then, as I said, the work is becoming more complicated, there's all these foods, there's all the dress fabrics coming into our country and these are to be worked among and thought among until we find the very best for our conditions.

We have our great sanitary systems and in our homes our water systems and our sewerage systems; still our woman in the home needs to have a nose educated to sewer gas. Last winter I came over from West Chester one day, couldn't make the train home in the evening and had to stop in one of our boroughs in the city. As I went into a home that night between ten and eleven o'clock, having 'phoned ahead, an odor met me that made me wonder if I would be able to stay in the house all night, and yet the home maker in that home did not recognize it at all and for sometime I was at a loss myself to know where it came from or what it was, but it was nothing, friends, but sewer gas from the bath room, and there was enough in

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that home that night to have poisoned the two little boys who slept in the room just next. I was able to close my door and open the windows to the outside. And so our home makers today in very many of our homes, and as we heard a little while ago, in twenty-five years perhaps every home will need to have a nose educated to sewer gas if her family is going to be healthful. Our home maker needs to learn to value herself.

The day is almost past when the home maker is going to be pushed in the back ground. So frequently we have seen it, both with the husband and the growing children, how the mother would be pushed back and pushed back and pushed back, not their fault but her own fault, too often, because she permitted it. She simply kept things going smooth and comfortable and never for once brought herself to the front. But that day is almost past and she must learn to value herself if she is going to be the home maker.

I like to think of a home as being launched. When we launch our ships we make a great deal of talk about it and we christen them and name them and send them off over the waters. When we launch a home, how much more important it is that we should christen that home, that we should name it, that we should have our Captain well instructed in making that home, in the duties that are before her, and then her efforts, her work is going to return someday; just as the ship goes off over the waters, so our home makers and the work of the home goes off over the sea of life and after a time it is coming back into port and I wonder what the cargo is she'll bring?

When I think of this, there comes to my mind the story that is told of the Roman seamen who were sent off. Four of them were going off. There was a dreadful famine in that country and they had hoped, as they went off in their vessel, to come back with each vessel laden with the best of grain for the famine stricken people, and just as they were ready to sail, a message came and the messenger said to the captain of the ship: "When you return, you must bring sand;" and the captain's head dropped and he was sorry for the message, but it was the orders and he said, "Very well, when I come back I will bring sand." And so the message went to the second and the third captain of the ships, and alike they all dropped their heads, but it was orders and they said, "When we come back, we will bring sand." And again the messenger went to the fourth captain and gave the orders. He thought for a moment and then, straightening up as we expect of the true man, the true farmer, there came to his mind a picture of the starving people of the City of Rome; he thought of the mothers with the starving babies in their arms and the little children crying for food, and he looked in the messenger's eyes and he said: "I am sorry, but you take back this message, that my life belongs to our Ruler, but when I come back with my good ship, I will bring her loaded to the edge with the very best wheat that the country produces."

And so, friends, when our home maker sails off over Life's sea, I am anxious that she be prepared for the very best, and that when she comes into port, she will bring the very best that there is in life, and then will she have done her whole duty, not alone for the little cottage and the little home or the little community wherein she lived, but she will have done it for this big State of ours of which we are so proud, because, while we grant our men that their masterpiece is the State, we claim for the woman that her masterpiece is the home.

The CHAIRMAN: Is Dr. Holmes in the audience? If not, we will proceed with the program. Next in order is "Woman's Share in the Farm Partnership," by Mrs. H. B. Fullerton.

Mrs. Fullerton spoke as follows:

## WOMEN'S SHARE IN THE FARM PARTNERSHIP

By MRS. H. B. FULLERTON, *Milford, Long Island.*

Madam Chairman and Friends: I think I will have to make a little remark before I start in this story. Mrs. Monroe said that land was cheap everywhere but on Long Island. I come from Long Island, in fact I was born on Long Island and I have three children who were born there. Long Island is Paradise and no one expects Paradise to be cheap.

I am very sorry indeed that I have no lantern tonight, because I have with me about 50 colored slides that I wanted to show you on this story of the woman's share in the farm partnership; but as the lantern is not here, I will have to do the best I can to tell you the little story that the pictures could tell you so much better than I can tell it. I was once asked to respond to a toast. "What is the wife's share of the husband's dollar?" And I promptly responded, "Fifty cents."

The woman's share in the farm partnership is just 50 per cent., because, while one's partner may be silent—and usually I'm the silent partner in our partnership—when you hear Mr. Fullerton, tomorrow night, you will know why. I own 50 per cent. of stock just the same. A home cannot be made without a partnership, and I have seen some very beautiful partnerships where they were not of the husband and wife, although that is of course the ideal partnership. I've seen a farm partnership of father and daughters; I've seen a farm partnership of brothers and sisters, of sisters alone. of brothers alone of mother and sons; but the ideal partnership is of the husband and wife. We always look to that for the ideal home.

We will start on the outside of the home and see where the wife can do a great deal—or the woman, I will say. because it is not always the wife—in making that farm partnership pay. Let us take a farm home that is new or very old and run down, and the very first thing that the woman wants to do is to beautify it. She comes into the farm partnership with the aesthetic sense more highly developed than most men. You notice I don't say all men. Her intuition, as a rule, is much more keenly developed than a man's and she may be able to get a picture of what that home should be or how to make it, better than a man can.

I would like to tell you of a few things that can be done in a short space of time to make the outside of that home beautiful. I think poppies are about as easily grown, and will grow in as many different kinds of soil as almost any flower that grows, and a five cent package of poppies will transform one portion of the home grounds. Vines will do more than anything else to cover up the old home and make the new home look old. Maybe you think I'm queer in wanting a new home to look old, but if there is anything I detest, it is a newly new house; it's just like newly weds, it shines all over. You know there never was a bride and groom in the world that wanted anybody to suspect that they were bride and groom; they want everybody to think they've been married a dozen years. Wild cucumber grows very readily from seed and will climb 40 to 50 feet in a single season. It has white blossoms and an interesting seed pod. It will sow its own seed and become a volunteer the following season.

If you have the children's Christmas tree from last year and it has not been burned up for fire wood, plant it out in your garden and make it blossom. We had a very interesting time one year when we first moved from the city to the country. We planted the children's Christmas tree in the garden and one of our neighbors looked over the fence, knowing that we were greenhorns, said, "Mr. Fullerton, do you think that's going to grow?" "Certainly, of course it's going to grow and be in full blossom the middle of the season;" and the neighbor turned away and told all the neighbors that we certainly were greenhorns. We planted nasturtiums around the base of that Christmas tree and it was in bloom all summer. The coursadea are extremely good to plant also; their blossom looks as though made of Japanese crepe paper; the leaves are large and not too close together so that the air can pass through them and cool your porch without shutting out all the breezes.

If you want to be extremely utilitarian, you can plant cantaloupes on your front porch. As I say, I am sorry you cannot see the pictures of these things. I could show you a picture of cantaloupes on the front porch with about 50 to the vine. It is utilitarian and beautiful at the same time. Copious scandans is a beautiful vine that has a purple trumpet-shaped flower. The blossoms opens a very pale green and turns irridiscent colors to a very dark purple. Carry that up under your porch and underneath the inside of the roofing on a fishnet or rope or anything of that kind. The blossoms will come out in the middle of winter under the porch when the vine is totally dead. We have gathered it under the front porch on Christmas day. Honeysuckle is good to have around the place, but I wouldn't have it planted around the porch because it is so dense that it will shut out the wind. I don't think any farm is complete without honeysuckle.

These vines I speak of now from honeysuckle on, are what are called permanent, that is when they are planted once, they are good forever. In all your garden work, plant for the future, not things that are going to require so much care every single season. Wistaria is one of the most beautiful vines we have, but don't put it on your buildings, it is too strong. I have seen it break iron pillars in two, it's crushing force is tremendous; but if you have in your grounds a tree that is dead or dying and that you are thinking about cutting down, don't do it; just cut off the limbs so it will be safe and plant wistaria around it, and if your wistaria blossoms in the Spring and you wish, after two or three years, cut off all the seed pods and it will blossom again; you can have two sets of blossoms every year.

The climbing roses have come to us within the last few years and have brought the most marvelous wealth of blossoms and beautiful foliage. I believe the most hardy is the Perkins. It is extremely hardy and grows with us on Long Island fifteen feet in a season. The gardenia is one of the most fragrant and one of the most delightful of the climbing roses in the yellows, in fact I think it is the most beautiful yellow blooming rose. It is also very hardy, with a wonderful red tint to the young shoots. The wild clematis (clematis vitalva) you may be able to gather around your woods here. That's the only name I know for it, friends, or I wouldn't give it to you, but it is the feathery white wild clematis and makes a most beautiful flower.

If it is a possible thing for you to have a summer house on your grounds, have it, make it of any common tree that grows in your woods, it doesn't have to be made out of planed or be expensive at all, but it is one of the most delightful places for the woman partner to go to on a hot day and prepare her vegetables and fruits for canning. I have a summer house in which I have prepared many, many quarts of produce for winter use. It is covered with clematis. Go to the woods and bring in the ferns from the shady spots, any of the wild flowers that grow in your fields, bring them home and they will multiply and repay you a thousand fold. On Long Island we have miles and miles of sand violets, one of the most beautiful sights in the world. Start with some of the hardy shrubs, like lilacs and Japanese snow balls and things of that kind, one at a time, and one or two each year, and let me tell you how to multiply those so that your cost is going to be extremely small and yet your place will be growing in beauty all the time. In the Spring you have often noticed around the lilac bush the little shrubs coming up all around the main stem. That is not good for the bush, the more that come out, the less blossoms you will have in your main plant, but each stalk is a new plant. Run down a sharp knife and cut it off with its little roots and set it out in your garden and you will have as many lilac bushes as you plant shoots of that main stalk. Chyrsanthemums multiply very fast. Iris or the flour de lis multiplies with tremendous rapidity. Three years ago we had many iris plants and three years ago I cut off the hands of each one of these hands is a new plant and I now have, after four years, the original 24 plants so large that I cannot get my arms around them, and 500 new plants.

Nearly all of your things can be sub-divided in that way. Nearly all the hardy shrubs send out shoots and if you set them out, even if they do not all grow, you are gaining something.

The chicken yard is the bone of contention on the farm. If there are any prospective farm partnerships in this audience that have not become full partners yet, do let me ask to have this put in the marriage service; when the man says, "I will promise to love, honor and cherish," have him say, "I promise to love, honor and keep the chickens shut up," and there won't be any more trouble as far as chickens are concerned. You know it is very much easier for the farmer to have the chickens shut up where they belong than have them running all over the garden; and there have been more squabbles about the chickens digging up the flowers, I guess, than any other point in farm life.

Possibly you have a tree that must come down and is not suitable for wistaria. See if it cannot be cut off about the heighth of a chair, then cut off again a little lower, half way through, to make a charming seat for the farmer's wife to sit on in the afternoon when she has to go out to do some mending, which is always with her. Let the welcome of this farm begin at the gate and not the front door. If it is possible to have an old-fashioned border from your front gate to your front door, it will be one of the greatest joys you can possibly have in your farm garden, and that can be made of these permanent flowers that come up year after year and will give you very little trouble. I have one 800 feet long. It is the greatest joy we have on our farm and when everything has gone crooked and we are thoroughly tired, we walk down our 800 feet of flowers and come back perfectly rested. That border has flowers in it of all sorts, from the earliest croecus to the last chrysanthemum, and there is never a day in the growing season when there it not something blooming in it; in fact I said this Spring, when the tulips were in blossom, that it was positively intoxicating and I had to keep away.

There is one thing we cannot afford to be without, either member of the farm partnership, and that is a bird bath, so that the birds will have water. Birds will consume more insects than we can hope to kill with sprays; but birds will not build unless they have water near where they make their nest. A very simple bird bath is made of an old stump with a quarter inch pipe running through it and a gas tip on the end. If you have a bird bath, you will have birds by the hundreds and thousands nesting with you and eating the bugs which are so hard for us to control. It is also the greatest kind of a joy for every member of the family, old and young, to see the birds come in their season. They become pets and get very, very tame indeed.

All this work in the garden is helping you to have flowers in the house in the winter and I doubt if there is a farmer who objects to his wife's house flowers. To come in on a snowy day, when you have been out in the cold, wrestling with the chores, into a house full of house flowers strikes the right note in every man, whether he speaks it out loud or not. There's à lot of men that don't speak those notes out loud, and perhaps it would be a very wise idea for them to do it.

I expect you think this is all very aesthetic and I have given you the very delightful part of the farm partnership. Would any of you go without it? Would any of you go without dessert? I think a whole lot of you would rather have dessert than dinner, and I have given you dessert first.

Now I am going to give you dinner. There is so much that a wife can do on the farm that it is really surprising, unless we stop and think what it may be. She can start the blowing up of stumps with dynamite. I have done it so I know. She could be a tremendous help in clearing land, as far as that part is concerned, and save a great many steps. When it comes to the tying up of young plants, either for the greenhouse or for the cold frames, she is a tremendous help because a woman's fingers, as a rule, work very much faster than a man's. I know it is said in textile work that where the fingers are to be used a woman is much more valuable than a man because of the rapidity with which her fingers move. Potting tomatoes has come to be a very great industry, because it forwards the tomatoes about three weeks. They are put into a paper pot, put back into the cold frame, kept cooled off so they won't grow too spindling, and when the proper season comes, set right out in the field and never know they have been moved. Tomato vines that have flower or fruit set can be put into the field and not checked at all. In bunching rhubarb, she is certainly a great help. Bunching radishes is a tedious task and one that requires care. I don't know whether you have market gardens very much around here or not, but on Long Island, which is New York's garden, we have the market gardens, because we feed the great city, and the packing of the vegetables is a very important part of the farm work, and a woman's keen sense comes in there, not only because she is able to select and size up, but because she has the artistic sense, and you all know that a package artistically packed will sell for a great deal higher price than one not artistically packed.

If you are here tomorrow night, any of you, Mr. Fullerton will have the lantern and will show you the package we are shipping on Long Island, that has become a National factor. It is called the Long Island Home hamper. It is a crate holding 6-4 quart baskets in two tiers; in each basket is placed a different vegetable, and it is shipped from the farm at six o'clock in the morning and sent direct to the consumer, reaching there at noon, and the orders are so great that they simply cannot be filled. It's a mail order business, and every hamper that goes out is fit for a king. Each basket and the entire crates are lined with parafine paper, and the packing of these vegetables is a big business, and one in which a woman is most eminently fitted to help along. For instance the bunching of carrots—you know that a quarter of an acre of young bunched carrots is worth about three acres of horse carrots; fruit—all kinds or fruits, a woman is very dexterous in packing and in wrapping, and the day is going to come when our Eastern fruits will be packed as carefully and made up as beautifully as the Western fruits are today; in fact we have packed strawberries faced up exactly like California cherries, and that very facing has brought double the price that an ordinarily packed quart of strawberries would bring.

Tomatoes are now shipped in crates, and a little story goes along with that. We were shipping tomatoes by the bushel and receiving for them three cents less than the package cost! Profitable! The more tomatos we shipped, the poorer we got. We went into the big markets in the city to discover why, and we found that tomatoes. were bringing 14 cents a bushel in crates, that is the crates were bringing 14 cents a bushel, and what tomatoes were not tomato catsup, were being sold. A bushel of tomatoes weighs considerable, and after it has traveled and been hauled over the cobble stones of New York a good deal, it's tomato catsup; so we packed our tomatoes in baskets, six baskets to the crate, and every tomato was perfect and polished and the commission man said there was no use trying to sell them because this was a different package from the standard New York package. So we walked around the district, wading through tomato catsup, saw tomatoes in bushel crates everywhere and went back to the commission merchant and asked to see our tomatoes, and he asked the clerk, "Where are those tomatoes that came from the Long Island experiment station?" "It's a funny thing, I sold those." That wasn't the answer that was expected, because he couldn't sell them. We finally asked what he sold them for and found that he got $1.50 for a little over half a bushel, instead of 14 cents a bushel. Therefore tomatoes from the experiment station are always packed in crates.

Possibly some of you are farming on such lines that you have no fruit; that's a very poor thing, because we all should have our own fruit to put away in the Summer for the Winter, it is one of the necessary elements for growing children and we can have more fruit, if we can't have standard fruit, the dwarf fruit trees can be planted six feet apart each way and will bear the third year—apples pears, plums, figs, cherries, peaches. We have a daughter fourteen who intercropped in those trees when she was eleven and made enough to pay for all the trees cost her to plant, cultivate and spray the first year and had eight dollars to the good. This is the third year; she is now fourteen and her trees are coming into bearing and she has made a profit from her land every year since. We can have our fruit trees as part of our landscape architecture if we want to, because the pruning is so simple that anyone can take care of it if the farmer is too busy to be bothered with fruit, because of his other various duties. When it comes to the selection of seed corn, we women can select it just as well as a man can. It is no small task to select seed corn; it is a big task. Chickens seem to be our own special prerogative, possibly because the mothering instinct is more highly developed in most women than it is in most men, and the little chickens require the greatest care. Butter making, as a rule, is conceded to us, and if we can help along in the farm partnership, if we can help along the farm itself to a higher degree of perfection through any of the things we can do, we are entitled to 50 per cent. of the stock in that company. I had the pleasure this year of winning the gold medal at our State Fair for butter, with a score of 99½. I am sure that counted in the farm partnership. When it comes to preserves and canning the summer goods for winter use, that is certainly our own, and did you ever stop to think what it means for a woman to can what a family needs for an entire winter? I don't believe it has ever been put very forcibly to you. There is a saying that we sell what we can and what we can't we can. We have changed that a little bit, because everything goes into glass jars. We sell the best and jar the rest, because we sell nothing that is not perfect because we find that it pays. One summer I was privileged to put into glass what was not perfect on a ten acre market garden with small fruits and one acre of large fruit, and when I had finished my summer's work, I had 5,500 vessels full of eats, and those sold at retail for 25 cents a jar for jelly and as high as 90 cents a jar for some of the fruit. Well, that looks almost as though the by-product was worth more than the manufactory, doesn't it?

A woman's divine right is to sew. She should know, she has the divine right to know how to sew and to cook and preserve and clean and take care of children, and a man has the divine right to know how to carpenter and to paint and to plumb and to lay cement and take care of children. And I think that's a partnership.

The CHAIRMAN: In the absence of Dr. Holmes, we will call on Mr. Seeds to talk on the Country Blacksmith, if he pleases.

Mr. SEEDS: Mrs. Chairman, Ladies and Gentlemen: I want to say if there is any session that I would willingly take part in, if I have to take part in a session, it's a woman's session, because I'm related to the women. My mother was a woman and I have had the good fortune to get one for a wife. And while I don't know what I am going to say, when I look at this program that we have tonight and hear about the farm home and the farm boy and every thing except the farm girl, I don't know which of these subjects to take up.

I want to cover them all and I want to say that you can muster together a hundred people and they won't look at the home alike. It depends altogether on how you look at it and what you get out of it, and what I mean by that is that I can put my hand on the shoulders of people who live longer in twenty-five years than other people would live if they should never die. All because they get close to the life worth living, and I know they talk about me doing things that I ought not to do, but I want to tell you that I am not going to change my way of living and my way of getting something out of life as I try to get it out of it, and it depends altogether on how you look at a thing.

Last winter when I lectured at Falls City, Neb., I landed there just before supper time and went out to the wash room to wash my hands. A man followed me from the office out to the wash room, and when I was washing in one bowl, he was pretending to wash in another. He was a perfect stranger to me and after a while he looked up to me and said, "I tell you, I got a good one yesterday." Now why didn't he tell that to somebody else? But he told it to me and I said, "What's that?" "Why," he said, "there was a man up here in Lincoln, Neb., moving from one part of the city to the other part of it, and he had an old family clock that stood in the corner, that had been handed down for generations, that he valued highly, and he did not want to trust that clock in the hands of the drayman to take it across the city to his new home, so that man picked that old Grandfather's clock up and carried it across the City of Lincoln, and it was heavy and every now and then he had to put the clock down and rest, and a drunken man watched him carrying that clock across the city and he followed him, and followed him, and he noticed that he had to put the clock down and rest, and once when he put the clock down, the drunken man went up to him and said, 'Say, Mister, if I were you, I'd buy myself a watch.'"

Now it depends altogether on how you look at a thing; but when you talk about the home and the boy and the girl, you are getting down to the material that is gilt edged and has a gold stripe on every side of it, and I want to tell you, my dear friends of Washington county, that right across the line here—you talk about the home—I lectured at Oakdale this winter a year ago, and a man took me out in the afternoon to the Industrial home of Oakdale where they have about 400 convicted boys, where men of Western Pennsylvania have gone down in their pockets and brought up money and didn't say, "If you put up one half, I will put up the other half, but they will put up the money and they bought a 300 acre farm right at your door out here and when a boy is arrested in the juvenile court and convicted, those hands that brought up the money part the veil and say, "Give me the boy," and they take him out here to Oakdale where there is no fence around the 300 acre farm, no high wall, until they have 400 boys, convicted boys, and listen to me—there never has been a boy ran away from that Institution that did not turn around and come back of his own accord, because he has a square deal and is surrounded by a life that is worth living, and there, within your doors, there are 400 boys that come from 400 homes in this country, that are not right—that's the truth of it.

Now, what can be done to make those homes right? I tell you that I have traveled from one end of this country to the other and there are people trying to solve problems in this country that they don't know anything about; and across the border, in the great State of Ohio, there are 11,000 applications for divorces, seeking the right and the privilege to wipe out 11,000 homes in that State. And I want to tell you that I have tried to get next to this problem, and I want to tell you that a girl hasn't any right to get married until she can cook a good meal or boss the job. She hasn't any right to get married until she can make a bed as neat and as nice as she can put up her hair, and tuck the covers in around the foot of the bed so a man's feet wont come out.

A young couple got married in Chicago and the young man didn't have much of a salary, and couldn't put a cook in the kitchen, and this young wife of his stepped into the kitchen to cook for that young man and couldn't cook a little bit. One day he came home and she'd cooked some doughnuts, and she knew they were not good, and when they sat down to the dinner table, she looked across at her young husband and said: "Harry, can you suggest anytihng that will make my doughnuts better?" Harry said, "Yes, my dear, make the holes larger."

And I want to tell you another thing, the trouble with the homes of this country is that the father and the mother don't take the children into partnership with them. And do you know, I think the saddest thing I know of or the saddest thing I see or come across, is where the relatives, including the children, take the old man out to the cemetery and plant him and can't wait till they get back to the house to see what the will says. I have seen that all right. They won't do that with me, I tell you that right now.

MR. HUTCHISON: I'll see that you are buried, Bob.

MR. SEEDS: When I made my will, Mr. Hutchison, I sat down to the table, I didn't go and lock it up, when I made my will, I sat down to the table when Josephine was nine years of age and read my will to my family, and that girl never told a word that was in it, not on your life she didn't, and I want to tell you one thing, talk about the home as you please, all the bouquet that I want, all the reward or honor I ask in this world is that when the race of life is run and I trot under the wire for the last time, is for my family to go to the sculptor and say: "Here lies Bob Seeds, he was good to his folks." That's all I've got to live for. I've got two girls and I thank God from the bottom of my heart, if I would never get home those two girls can go out in the world and make a living, and they can cook a meal, and they are both going to Europe four weeks from today, and so far they haven't asked the old man for a dollar.

A Member: That's the part you like.

MR. SEEDS: That's right, you bet your life, that's what I'm proud of; that's why I know that if anything happens to me, they can go out into the world today and make a living and dress themselves without having a dollar left them, and that's what I am trying to do with my boys, and the trouble with my boys—I've got four of them—you talk about the boy in the home—the trouble is that when I educate that boy and send him away from home, I can't keep him away from home. I had one up in the mountain in the coal office for four years; he came home on the first of April to stay. Now I think that's all right, I don't find any fault with it. And then another thing is in that home and around this building, you have got in that home to get away from the drudgery. I tell you I like to dress up once in a while and look nice and all that kind of business, and we must get away from the drudgery, get what you want for the least possible price around the home.

I went home last summer and got to attending to the chickens and got to carrying the water for Mary's chickens and ducks. I didn't carry the water for the chickens and ducks very long, before I realized that to give those chickens and ducks all the water they wanted, it took about a barrel. Well, that's all right. I got to thinking at night and thinking when I hadn't anything else to do, you've got to learn to think you know, and today we don't carry a drop of water in the winter or summer for a duck or chicken, and they can't waste it, and can't make the pen wet or anything else. I say, "Behave yourself, there's the water," and they obey me and that saves a lot of trouble. Now they had a self feeder, it would last about a week and I wouldn't have to do a thing but gather the eggs and have the pen to clean. Now that's the way I try to get at it, and I want to tell you that that's my principle around this home. I have been lecturing on "How God made the soil fertile" for—how long?

DIRECTOR MARTIN: Oh, twenty-four years.

MR. SEEDS: Well, I don't know how long. Dr. Thorne said things on the platform this afternoon, at Seaman's Grove they were going to kill me for saying things like that twelve or fifteen years ago. The whole thing is to get away with the drudgery, and how I would like, from a religious and scientific standpoint, to see how man should make the money and have something after this expense is paid that the lady talked about here a while ago, that her daughter has left—it's the left part of it that cuts the figure, it is the $8 that is left that cuts the figure to the daughter; and a while ago I made up my mind that if I had my farm in alfalfa and it cost money to send men and boys out and bring in the alfalfa, so I said I'm going to have hogs to go out and bring it in, but last year the hog cholera struck me and I lost a thousand dollars, that's the other side of it, but we saved 40 out of the wreck by innoculation and we have 200 or 300 hogs now and I expect to have 500 or 600 again the first of October. If we are right in believing that they are immune, I want to tell you that that thousand dollars is money well spent; and when my friend, Charlie Warfield, who runs the Ward House at Tyrone, tells me that two years ago he had hog cholera and there—I was trying to fix something up that I was going to say a little bit later on, and I guess that's the way I made that mistake. Well, his hogs had the hog cholera—I guess that will do all right—and he has a mother down there right now, there stands a mother that was innoculated two years ago, with little pigs at her side and they died all around and other mothers died that had not been innoculated and this mother that was innoculated lives and her pigs live. If we can do that and know that we are right, it is money well spent.

Now these are the things that go to make up this home. I have always tried to take sunshine into my home and God only knows I try to live at home the way I talk about living at home when I am away from home. That's what I want to say. I want to tell you I have always tried to take sunshine into my home; I've carried that sunshine back that I have talked about for years and I am going to keep on carrying it and my family catches it, and I want to tell you that's the way to live and that's the way to have this home, and I want to tell you my dear friends, that you can't buy it with money.

I thank God from the bottom of my heart every twenty minutes that you can't buy happiness and health with money. I wouldn't give my stomach for old John D. Rockefeller's and all the millions he's got. Why John D. would give millions of dollars to be able to say what the poor tramp said who begged the loaf of bread from the lady at the kitchen door and put the loaf under his arm and started down the street. The loaf worked around and worked around until after a while it fell to the ground and a dog ran up and got it, and down the street the dog went with the loaf of bread, and the hungry man looked after the dog and said, "All right, take it and thank the Lord you haven't got my appetite." John D. Rockefeller would give millions to be able to say what that tramp said.

Talking about sunshine in the home and making the home like it ought to be, the National Stockman has had the picture of Bod Seeds' barnyard in their paper, and another paper took the photograph last week off the back of my buildings, and I am going to name it, not $3.15, but 15 cents and 3 dollars; it took a bushel of lime and two days work to change the whole face of that property. Does it pay? Why of course it pays. That's why you can't get the boys and girls to leave this home on the farm. It's the greatest place in the world to live, out on the farm, and then the only thing is to get that farm so that it pays and get something for your trouble, because I want to tell you that you've got to have some money, and it is what you've got left without being worn out and going through lots of drudgery to get it.

Now I guess I've talked long enough, Mrs. Chairman. I don't know what else I can say along this line. These things are close to my heart, and I want to tell you that last winter I lectured at Binghampton, New York at a winter Chautauqua, and a learned man came all the way from Boston to talk about the boy scouts, and got up and said that the boy scouts would take another boy and blindfold him and put him on a freight train, and if he could get back, he could join the boy scouts; then he talked about the boys' running away from home. Why, you couldn't make me believe that in a thirty day argument. I want to tell you there never was a boy or a dog that ran away from home when they had a square deal, never in the world. Never in the world would he run away from home if he's got a square deal, so let's make this home and let's make it like it ought to be and it's no use spending a lot of mony. Lots of people don't think anything about that, but I do and when I'm away, if anything comes into my home that creates a laugh, they will save it till I get home.

Not long ago I went home and sat down to the table to eat my first meal, and one of the little boys looked up at me and said: "Papa, if you would turn the X-ray on a dog's lung, what would you see?" Well, I scratched my head a while, and finally had to give up, and I turned around to the little fellow and said, "I don't know; what would you see?" "Well," he replied, "papa, if you would turn the X rays on a dog's lungs you would see the seat of his pants." Now that little boy came to me with that. I was going down Chestnut Street, Philadelphia, last winter a year ago, and a man came up to me and pulled my coat, a perfect stranger, and said, "Seeds, I'd like to ask you a question." "What do you want to ask me now?" "What's worse than finding a worm in an apple?" I said, "Finding two worms." "No, that won't do." I said, "If finding two worms is not worse than finding one worm, I don't know; I'll give it up. What *is* worse than finding a worm in an apple." He said, "Finding half a worm."

I can go into any man's home and sit down at the table with him and with a smile on my face eat mush and milk with him and relish it if he has a mortgage to pay, but I would like to go from one end of this country to the other and cut some stocking strings I know of and take out enough money to put a bath room in every house from the Atlantic to the Pacific. You ought to take a bath every Spring and Fall, whether you need it or not. An old duffer went down to Philadelphia and went to the Bingham House, and the only room he could get was one with a bath in it; so he got the room with the bath and spent the night in that room with that bath tub, and the next day he met one of his friends from up in his country, and after shaking hands with him, he said: "I tell you what, you ought to have seen the room I had last night. I had the greatest room you ever saw; I had a room with a bath, porcelain lined bath tub, hot and cold water and all the towels I needed." And he said, "Oh, but didn't I wish it had been Saturday night."

And I want to tell you, my dear friends, that when you get this home right, I want to tell you and I mean it, I tell you that when a man will do what I'm talking about in any community, that community will be made better; and God only knows, nobody knows better than I do, that the best religion in the world is the religion over here at Oakdale. I want to tell you that when you get a community like that, you've got an influence; and God only knows, I hate

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to say it, I get into communities where I wouldn't have my six children grow up in that community for five of the best farms in it, not for five of the best farms, showing the power of influence and the power of environment and the power of surroundings.

When the home is all right—I can pin this down by telling you of two young men who graduated at College; one started out to preach the Gospel, the other got on a ship and went around the world as a mariner. His ship came back after sailing around the world and anchored in the harbor where his friend was preaching the Gospel, and the anchor wasn't more than cast until he said, "I'm going up to see my friend, John, and see how he's getting along preaching the Gospel, and I believe I'll take my parrot along up with me. So he started along with his parrot to see the preacher. He went in the house and set his parrot down on the center table and after shaking hands with the preacher, he said, "John, I've brought my parrot along, I want to show you what a great talker I've got in my parrot, he's the greatest talker in the world." The preacher said, "That's a queer coincidence, I've got a parrot and I think mine is the greatest talker in the world and I will go and bring him in and show you a parrot that can talk." So the preacher went out and got his parrot and set it down on the table alongside of the sailor's parrot, and the two birds sat there looking at each other for a while. And after a time the preacher's parrot said, "What must we do to be saved?" The sailor's parrot said, "Pump like Hell or go to the bottom." That shows the power of influence, the power of surroundings and the power of the home.

And I want to say, my dear friends, in Washington county, that you live in the greatest country in all the world out here. They can talk about all the countries of the world, I've been over some of the United States and I want to tell you that Pittsburg, in a radius of a hundred miles, is the greatest spot in the known world. That's right and I mean it. You've got the farm land, you've got the coal, you've got the gas, you've got the oil, you've got the greatest manufacturing interests in the known world and the greatest markets the sun ever shown upon; that's the kind of a country you have in Washington county, and around Pittsburg.

It puts me in mind of two old fellows over here in Pittsburg. One old fellow read the description of a sky scrapper they were going to put up in the city. After he read the account of this great building they were going to erect, he met one of his friends and said: "They allow to put a building up in Pittsburg so Gosh dang high that the top will reach most half way to the moon; they are going to set it on the corner where Fifth Avenue crosses Wood Street, right where the old cigar shop for years and years has stood. It is going to be so consarned tall that folks bound for the top will have to have a pilot or they won't know where to stop. You'll wish for three days' rations, a change of clothes and socks, when you start for the upper regions in that elevator box. There'll be so many stories to this building, goodness knows that a fellow couldn't count them on his fingers and his toes; and when one gits up to the garret, he will have to have a spy glass or he cannot see the town. The Allegheny Mountains then will dwindle out of sight; sky larks will get dizzy if they fly to such a height. The people must be going crazy; feet and yards are out of style; soon, they'll have to measure buildings by the furlong and the mile. If the city keeps a grabbing and spreading up so high, there soon won't be no room at all twixt the street and the sky. The sun won't have no room to pass through Pittsburg anyhow, and it will have to go around by Wheeling and Bellaire."

The CHAIRMAN: This closes the program for the evening.

MR. HUTCHISON: I am sorry Dr. Holmes couldn't be here. It places the College at a little disadvantage. As a trustee and representative of the College, I will say that some mistake or some accident or something has happened, because it is well known that our force up there are anxious to serve the people of the Commonwealth, and I know he would have been delighted to be here if he had not been detained. I have a letter from Dr. Sparks speaking of it, and I cannot tell, and the teachers and professors here cannot explain it.

I want to compliment you ladies on your entertainment; and my friend Seeds, and I know it will stimulate the Institute and help the sessions, the Ladies' sessions throughout Pennsylvania, this meeting that you held tonight. I speak for the Board and for the representatives here, the Chairman of the different counties and I want to thank you for the good meeting you have had.

After announcing the program for next day, the meeting adjourned.

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Wednesday Morning, May 21, 1913, 9.30

Mr. John T. Smith in the Chair.

The CHAIRMAN: The meeting will please come to order. Fellow members of the State Board, and Chairmen of Institute Workers, Lecturers and Citizens of Washington: It gives me great pleasure to be in your county this morning. Although it is my neighboring county, I have never been here before, but I feel almost as if I am at home with you. I scarcely reached your town until I met some of the old people who used to live over in old Fayette. I met several of my neighbors of years ago who have now moved to Washington county, so I feel at home. One of the first men I met was a young man I used to teach school with nineteen years ago. He was on one hilltop in the mountains and I was on the other, and I had not seen him for about eighteen years until I met him on the train. I find he is one of the foremost men in your town. I refer to the editor of this paper, Mr. John L. Stewart.

You have some nice towns over here. In our county it is mostly coal, coke and smoke, Monarch smoke. I know there are a great many farmers coming into this meeting. I think we can have a good deal of interest developed and get it going a little like the story I heard of an Irishman. There was an Irishman one time who was a courier on the railroad; his business was to clean up the engines as they came in in the evening, and one evening an engineer came in late and said, "Pat, wouldn't you like to be able to run an engine like I can?" "I would," said Pat, "I'd rather do that than eat my supper." "Well," replied the engineer, "hurry up and clean this engine and you may run her into the round house." Pat cleaned her up, got in, pulled back the lever ,turned on the steam and the engine started into the round house at a terrible speed. He was afraid he was going to run clear through and come out the other side, so he jerked the lever back, reversed it and the engine started down the railroad track at a great rate. He reversed it again and went back into the round house and beckoned to the engineer. The engineer said, "I thought you could run an engine?" "Aint I running the thing," said Pat, "don't you see the thing going up and down the track?" "Well," said the engineer, "why don't you stop it?" "Why didn't you shut the door of the round house when I had her in there?"

Now we want to get this meeting going at such a rate that we won't know how to stop it, and have one of the best we ever had and I don't want to stop until the Secretary calls us down on Friday. The first man I will call on this morning is Mr. R. J. Weld, Assistant Secretary of Agriculture, who will talk to us on "Selection and Breeding of the Dairy Herd."

Mr. Weld spoke as follows:

## SELECTION AND BREEDING OF THE DAIRY HERD

By R. J. WELD, *Sugargrove, Pa.*

Mr. Chairman, Ladies and Gentlemen: The best information I can get regarding cows is that 4,400 pounds of milk per animal is the average production. I assume that is pretty nearly true. This morning I want to tell you a little personal story, if you will pardon a personal reference in the matter, about a herd of animals that produced, on the average, 4,400 pounds of milk in the beginning and upon that foundation was builded a herd the end of which is not yet, I hope, but which has advanced in production over a ton of milk per cow from that start, and this is the herd I have been personally interested in and I am going to tell you about it because it is a thing I know the most about relative to cows.

Just refer to the chart for a minute. At the beginning, this herd, when we first began to keep records, showed the results at the end of the first year that are indicated on this longer chart by the first set of bars. There are three sets of bars. Those bars indicate the lowest producing animal in the herd (indicating on chart), the middle bar indicates the average production of all the animals in the herd and the longer bar the highest production, or the production of the animal that produced the most. There is what we get at the end of the first year, what is indicated by those bars there. Then, period by period, as is indicated by the dates, results have been compiled and drawn off and charted out so that we might see what increase or improvement of advancement was made as the result of our work up until last year, which is over here on this shorter chart. For instance, compare the middle bar there, 1912 with the middle bar here in 1894, and you will see that there is a gain of 2,700 pounds of milk per animal. Now, no new animals were bought; we just started with that average herd and that is a point I want to bring out first, the selection of the animal.

In our work as Institute men, traveling over Pennsylvania, the inquiry comes up at almost every place where they are interested in buying, "Where can I get some good cows? For instance, where can I get some 7,000 pound cows?" They are not to be had, gentlemen, in any great number. They are not to be had in the number that will meet the demand in Pennsylvania. They have got to be produced, got to be grown on the farm, and they should be, because, along with the development of the dairy itself, must come the development of the dairyman, when we had 4,400 pound cows, we had 4,400 pound men; that's all the ability we had to produce milk, because part of the production of the cow must come through the skill and knowledge the dairyman has to make that production, and in any dairy in Pennsylvania where the man hopes to improve, the improvement must be in the man first, he is the leader, it is the man that blazes the way! so I think the wise and sane plan for the dairymen of Pennsylvania is to develop their own herds. It means some expense, some trouble and its a little personal work, I know, and it does more or less interfere with our general farm work.

This was brought home to me about three weeks ago in my own herd in a way I never had known before. I had gone into a cow testing association so as to be in with fellows that are interested in the work. All the rest of them are over in New York State, but they did come over the line and let me in, and the tester came to my place and relieved us the 24 hours he was there of all the work excepting the milking of the cows. The man and I milked the cow and turned the milk over to him and he weighed and took care of it after that, and I discovered then that the time it took up to do this work amounted to nearly as much as the time of milking the cows, so it is somewhat of an expense to me to carry on the work. Nevertheless I will try and show that I have been warranted in making this expense, just as Dr. Thorne showed us yesterday that we are warranted in making an expense when we get the desired results.

What I found in that first upper bar—see the length of the short bars compared with the length of the long ones, and those are all cows that had been bred by my father on that farm and were thoroughbred animals, and yet we found that difference that is indicated by the length of those bars and prior to the determination of that acurate knowledge, we were just guessing at it, you see. After we had the accurate knowledge, we discarded, of course, those animals that made the lower records. The getting of the daily weight is a thing that a good many of our farmers fall down on. It is like the man Dr. Thorne told us about yesterday, he wanted to harvest that ten acres of clover and let the experimental plot go and get wet and he lost the results of the experiment. You have got to be whipping yourself up to the point that the daily data we accumulate day by day is the thing that makes the final result and the securing of this data is not expensive in the paraphanalia required to secure it. It takes a little time, but it is educational in its effect, it makes observing men of us, careful men, it makes men that are accurate in their work. Why, the keeping of the data pays me year by year just in the influence it has on the man that helps me; he likes to have everything that goes down in black and white for the inspection of his employer look well, be a credit to his work, consequently it keeps him up to his standard, and that is what we did, we got that information, we made the selection upon the basis of the information or upon the basis of the performance, upon the proficiency, if you please; that was the basis upon which we made the selection of the animals in the herd and are making it today, because we are just keeping on day by day and there is still a difference after eighteen years, in the ability of the individual animals in that herd to produce the pounds of milk. So it is not safe for me, as a dairyman, to rest on any work I have accomplished so far and be sure that the business will still continue to be profitable to me.

I made the selection then upon that basis, with the daily use of the milk scales and the monthly use of the Babcock test and a certain day in the month comes and it is the day to start to take the samples and if the threshers are there silo men are there, it don't matter what urgent piece of business is on hand, if that is the time to commence, we aim to commence so we will favor each animal with uniformity of our part of the work, we will give each animal a chance to show just what she is capable of doing and not doing under the average daily conditions that exist and affect all the animals.

After we have made this selection, there is another point, the securing of some animals to take the place of those we are going to discard. We are going to discard some because a 4,000 pound animal is not a profitable animal and if the average is only 4,400 pounds, there are a number below 4,000 and if a cow won't give over 4,000 pounds of milk in Pennsylvania, she is running her people in debt and we don't want to be that kind of men, we don't want to be prosecuting a business that is running us behind and we should not. So, to take the place then of the animals we must necessarily discard year by year for one reason or another, primarily because they are not capable of coming up to our standard and we have got to have some to take their place. Now here comes another point—we couldn't buy them, didn't want to buy them. The only animal that I know absolutely was a diseased animal on our farm, an animal that was bought and brought there as a calf, and afterwards developed disease. Whether the predisposition came with the animal or whether the whole thing developed on the farm or not, it is true, she is the only animal that ever di seased on my farm that I know of. That is one reason why I want to raise them. Another is, that I want them under my personal supervision from the time they come into this life until I am through with them. I can weave into them or attempt, at least, to weave into them, the characteristics that I hope for and desire and think will develop a proficient animal.

Now I have come to believe that in breeding, we first should have a standard, then we should go after what we want. I am supported somewhat in that. We are going back to the first book in the Bible, the book of Genesis, and I find that a certain man wanted ringed-streaked and speckled cows, a certain Jew; that's the kind he wanted, that's the kind that meant profit to him, that's the kind of cow his father-in-law would give him as his wage, and he went after ringed, streaked and speckled cows, and the Divine Word says he got them. I believe that holds true right down to this date and we want to go after the thing we want. That means this, that we've got to have an ideal, we-ve go to know what we want to get, tempered with the best knowledge and with our experience ,tempered with the environment we have at home as compared with the environment under which the dairy breeds have developed, and tempered also, if you please, lastly, by the general character of the animals in our particular neighborhood. For instance, if in my particular neighborhood there are eight or ten men breeding the same breed of animals, there is an advantage for me to go in with them in that same line of breeding. We can cooperate in more ways than one; we can compare notes, we can cooperate in building and developing, we can co-operate in buying and selling, a decided advantage, as you know. So that is the thing to do.

Now in dairy work, the thing that I was after on my part was butter fat, and I contend this, that first, if you want to get pounds of butter fat, you must have pounds of milk or pounds of material to carry that butter fat, so there are two factors in it that I was after—I wanted a lot of milk and I wanted rich milk, and I looked to one of the breeds that gave a large flow, comparatively large flow, and that also was rich in butter fat, because that was to be my cash product, my cash return from this dairy was to come through the medium of butter that I sold. For that reason I want a breeder then with this charcteristic, and after getting an animal—and by the way, that's where I spent the money, not very heavy, not enough to swamp anyone; I spent, to be specific. Since 1894, I spent $220 only in buying thoroughbred animals for my herd and $100 of that was spent last year in the last animal I got so I haven't spent anything exorbitant, and I have not spent a sum beyond the reach of any breeder of dairy cattle in Pennsylvania, in order to accomplish this result I have shown you thorough breeding and to be particular about it, I have sold these animals so far, when I have gotten through with them for enough to reimburse me. The account stands me in debt now, but I have two animals on hand, one of which I expect to sell this year. Whether I will come out even or not I don't know; that is a side line that should not stand in the way of the breeding.

The Director of Institutes in New York State said last February that a man could pay $400 or $500 for an animal that will put into his offspring the development and improvement that he is capable of putting in, and still make money at it. Well, I chose this animal, used him for a reasonable period of time, then chose another of the same breeding a little better, better backed up, reinforced with better production back of him, and have kept right on in that line from time to time, getting a new animal about every three or four years to take the place of the old one, not practicing inbreeding, keeping shy of that, and keeping up the matter of selecting the animals upon the basis of their performance, and in that way have gotten the results as indicated upon the chart before you.

**A Member:** Is your herd Jersey or Guernsey?

**MR. WELD:** Guernseys. The heads of the herd have always been registered Guernseys.

A Member: Do you inbreed?

MR. WELD: I did in the first instance, sir, because I made a radical cross, but since then I have not inbred, but in the first particular, when I made the first cross, I had half bloods, then I inbred them because, as I have already stated, I was making quite a radical cross from the mother in the herd, and got good results so far as I could see.

A Member: Does that warrant the influence of a good sire on dairy herds?

MR. WELD: I believe so; I believe that is the best thing for the Pennsylvania dairymen to do.

The CHAIRMAN: Will the gentlemen in the audience please write their theories down or else give them after Mr. Weld gets through with his speech.

DIRECTOR MARTIN: Just a word. If Mr. Weld would consent to allow direct questions, we will be glad to have you ask the question just as it comes to your mind. I think the stenographer can get them, and it will probably aid Mr. Weld in arriving at a conclusion as to just what you want him to develop in his talk.

MR. WELD: Now it seems to me that the dairyman who follows along this line only puts into operation just the same principle that the poultryman does, that the corn man, that the potato man does or that any other man does who is trying to improve the thing that he is working with, be that animal or vegetable. I cannot see it any other way than that there is simply one principle involved and that is the selection of the fittest, the selection of the animal or animals whose performance indicates that it has capabilities and possibilities above the average, and when we do that and follow that up with improved conditions and environment that are demanded by the machine that is going to make a greater performance for us, we are surely going to get some results for our work.

And it strikes me this way, that it is good for a young farmer, a young dairyman, to branch out along that line. It is an educational advantage that he has, it is an opportunity to pursue his education, if you please, right along day by day, after he has gone on to the farm and gotten into the harness for himself. He has left school, he has left the Agricultural College, perhaps taken with him what is in the books and what he has got in the class room, he puts that into operation ,he runs against obstacles, he tries to solve them and does solve them. He solves them out of the knowledge he gets at home, reinforced and backed up by the knowledge he mines out day by day in his work, so it is a decided advantage on that score in the matter of selecting the animal or plant we are dealing with. I have come to believe that the man who is careful in his obligation and makes a study of the selection and preparing and the crossing of animals, will make a better parent, he will make a better father, when he understands some of the laws of Nature that enter into all plant and animal life, and to his profit and to the advantage and profit of the neighborhood in which he is situated.

Now as to whether or not it pays—it has taken in some work upon my part to get this done. Not until this present year was I able to get into this Association, which I think is a grand, good thing, and I went into it just to get stimulated a little so it would come nearer home and we could get it started at home and more might get the advantage of it. Where that is possible, it relieves the individual man, somewhat, of some of the tedious part of this work. Nevertheless it also takes from it some of the personal interest he would otherwise put into it day by day. In the time I have covered in the selecting and breeding of these animals up to the close of 1912, I was able to make the animals that came from that foundation herd of 4,400 pounds produce me 7,144 pounds, or, a gain of 2,744 pounds of milk per animal per year. Now that amounted to something in dollars and cents if I had sold the milk, but I did not, I converted that milk into butter and sold the butter and made a gain in butter fat.

The lower set of bars here indicates the butter fat; the first year I only had an average yield of butter fat of 186 pounds. There was one animal that went higher, and a number went lower than that. Last year you see the result was 338 pounds of butter fat, a larger percentage of gain in butter fat than in pounds of milk. I attribute that to the fact, already developed, that I was breeding along the line of animals noted for the production of butter fat, and that the pounds of butter fat that has been increased, per animal, was 151, or in other words, I had increased the production of butter fat per animal in an amount equal to the average production of butter fat of the average cow of Pennsylvania or New York or Wisconsin. If I sold that butter fat for 30 cents a pound, I have increased it $45 worth, and it seems to me that has absolutely paid me for the time and trouble I have taken in developing this herd.

**MR. GOODERHAM:** You say that you have been building up your herd for 18 years?

**MR. WELD:** Yes, sir.

**MR. GOODERHAM:** Has each of the crosses been an improvement over the cross before it?

**MR. WELD:** Well, yes, Mr. Gooderham, each of the crosses has been an improvement, although there was one cross in which I practically stood still, but it was for another reason, I think. I believed that I was the factor that was at fault, not the animal that I had at the head of the herd, and the factor was this: That I did not appreciate the fact that increased production called for a greater amount of fuel, and I was not giving the animals enough. Of course that question comes right along with the question of development; we are not to take that up this morning, but that must come. This one period in which I seemed to stand still and did stand still for two or three years until I got the situation analyzed, was the fact that I was not supporting those animals sufficiently to enable them to make the increased production. Now several factors entered into that. The natural pasture I had been depending on year by year got poorer and poorer; there was a falling off that said I had increased the stock, a larger number of stock were on the same area, but cut down the amount of food they had; so I was entirely at fault, and, as I said before, the breed or the breeding was not at fault. Now, if there are any other questions, I will be glad to answer them.

MR. HULL: What is the object of the cow testing association and what is the benefit of it?

MR. WELD: The object, Mr. Hull, is simply to have a man come to your place and test and weigh and sample and advise you instead of you doing it yourself, and you pay him for it and he does that along with twenty-six neighbors of yours, and does it monthly and you pay him one dollar a cow, or in our Association, the minimum fee is $20. I have to pay $20 for this man and he will come to my place 12 times in the next year and be there for 24 hours only and compile some data, presumably, from which I can draw some conclusions as to the animals I ought to keep or discard. In my case I am doing the work myself, but other fellows in the Association are not doing it and they are going at it blindly just as I was before I went into the work, and he will be a help to me because he will put before them some definite data or information upon which they may base their judgment and base their selection, and he will advise them—he does advise them. He told me of a number of instances where he advised them in regard to the ration they were feeding, and they were not feeding a ration that was in accordance with our best teachers as to the kind and quality and amount that the animal should have to be able to produce what she is able to produce; that is his work.

MR. HULL: That man is an expert?

MR. WELD: Yes, he is an expert along that line, but he is not as expert as I wish he was. He is a young man, this man that we have, he is under majority, he is 19 years old, he lacks personal experience, but he is the best man we can get hold of and rather than have no man at all, we'd better take this man. He will develop, at our expense, but we are warranted in making the expense, but because if we didn't have him, there would be nothing done along that line and the 26 of us in the Association would simply go along in the same ruts we have been going along for the last 25 years and no improvement would be made. In every instance I know of where an Association has been started and interest aroused and enthusiasm awakened, good has resulted. It is a sort of a missionary work that precedes more substantial improvement in the dairy situation.

MR. BILLINGS: Do you still weigh your cow's milk, individually, every day?

MR. WELD: Yes, sir.

MR. BILLINGS: The whole Association does that?

MR. WELD: No, only part of the Association are doing that.

MR. BILLINGS: They allow him to weigh for the one day and figure from that?

**MR. WELD:** He does this, Mr. Billings, in my own case and in the case of every man that is weighing, he takes the actual weight for the month and the man who is not weighing takes his own weight for the 24 hours.

**MR. RODGERS:** Tell me what effect the inbreeding has when you come to enter the stock, have it registered in the Breeders' Association; do they object?

**MR. WELD:** In the Guernsey Association they do not. Whether they do or not in the other associations, I cannot tell you.

**MR. ROUSE:** They do not object in the Holstein Association either.

**DIRECTOR MARTIN:** Mr. Weld, from your experience in traveling over the State and testing butter fat content in the milk of various cows in different portions of the Commonwealth, have you been or have you not been impressed with the thought of the importance of dairymen learning exactly what is the product of each of their cows, each cow of the herd? I would like to have your experience along that line.

**MR. WELD:** Yes, Mr. Secretary, we have been impressed with that thought, that the average dairyman knows comparatively little and he makes serious mistakes. That was brought right home to us last winter in one Institute we held when two animals were brought down, the milk of two animals was brought down to be tested and the test was just the reverse of what the man expected. Now, if he had based his selection, you see, upon his expectations or what he thought was his knowledge of the animals, he would have drawn a wrong conclusion because our results showed just the reverse. The animal he thought would test best, tested the lowest and the animal he thought would test the lowest, tested the highest. Now if there are no other questions, I will thank you for your attention and close.

The **CHAIRMAN:** Has anyone any remarks to offer on this subject?

**MR. STEWART:** I want to know of Mr. Weld if he tests a cow at the beginning of this month, for instance, and finds that she shows a certain per cent. of butter fat, can he, by feeding and care of that cow, make her show a higher per cent. in one month or at any other period thereafter? I am not a dairyman.

**MR. WELD:** Well, Mr. Chairman, that's a question we get almost everywhere we go.

**MR. STEWART:** I never heard it before.

**MR. WELD:** Mr. Stewart, the best information we have is this; that the animal is born to give a certain percentage or richness in milk, granting that she has the normal conditions, that will enable her to do it and that she is normal health and that every thing is normal when the sample is taken and the sample is taken correctly and correctly represents what she produces. Beyond that we are not able to stimulate or increase the percentage of butter fat. Now that is contradicted time and time again by a whole lot of conditions. The sample may be taken when the animal is out of health the sample may be taken when the animal is underfed or excited or when the animal is not in normal condition, or the normal conditions under which the sample was taken were disturbed and then the sample will vary from the normal, and you take one thirty days later and if that is under normal or abnormal conditions, you may get a decided difference in the sample.

I overcome that in this way: I take a sample of milk from the cows for 8 consecutive milkings, 4 days, just to overcome the daily variation, because there is a daily variation under normal conditions. This spring we sampled animals in my herd every day for a number of days and we had as high a change as two per cent from the highest to the lowest, run it right along for 14 milkings, so you see the animal has a most wonderful control over the quantity and quality and you have got to catch her, if you say an animal tests so and so, you have got to catch her when the conditions are such that she is just giving what she normally would, and so often the conditions are different—if it is a hot day or the flies bother her or somebody comes into your stable unexpectedly—anything that will affect the flow will affect the quantity; so, to get as good conditions as you can, we want to keep everything in smooth running order. For instance, to illustrate: The other night when this gentleman came, he is a strange man and had never been on my farm before, his name is Martin, I said, "Mr. Martin, you may ask us any questions that are necessary while we are milking, but we are not going to attempt to visit with you at all." Mr. Martin staid in his place, asked a few questions, he asked them quietly and we prosecuted the milking that night as quietly as we could, had everything as normal as it could be, because I wanted that day's result to represent what the cows would do if the stranger had not been in the barn, and I took extra precaution the first time he was there, because he was a stranger and the animals are sensitive to a stranger, and I asked him as a contributing factor to the result he would get from me, to abstain from visiting or unnecessary conversation or anything that would distract the cows attention from the fact that we were milking her.

MR. STEWART: Haven't you found that the next day she would overrun her percentage?

MR. WELD: Yes, sir, if she goes high, she will drop back the next.

MR. STEWART: And if she loses one day, the next day she will overrun her natural percentage.

MR. WELD: Yes, sir.

MR. BILLINGS: That isn't always true.

MR. WELD: No, sir, but that is the general supposition; if you have a high test one day, you are liable to have a low number of pounds of milk, and then the next milking you will have an increased flow and the percentage of butter fat is liable to be lower than it was.

MR. BILLINGS: Then do we understand that if you get a low test to-day, the quantity is low also?

MR. WELD: No, with a low test you get high quantity.

MR. BILLINGS: Just another question right here: Changing your cows from dry feed into pasture, how does the test run?

MR. WELD: The test will drop invariably, because you not only change feed, but a whole lot of conditions. You change the animal from comparatively quiet conditions to an opportunity to run and race and tear around, and you change their feed, you change them from a condition under which they have feed and lay down and rest and stimulate production of milk, to a condition in which they can spend the whole day on their feet and come in at night tired and lie down and all those things lessen the butter.

MR. BILLINGS: Last month if you were testing the cows in the barn and this month in the pasture, your test will run lower?

MR. WELD: Yes, sir, my test will run lower but the flow will be higher; the flow is creeping up day by day, and when I make these tests next week, I'm pretty sure the test will be low. The May test is low; the June test will be a little better, but pretty much the same as the May test and then it will gradually start up towards the end of the year.

MR. BLACK: Do you feed any dry feed?

MR. WELD: Yes, sir, feed grain the year around.

MR. BLACK: Does it make any more butter?

MR. WELD: Yes, sir, because I increase the flow of milk, I get more pounds of butter, because I have increased the carrier. For instance, if the cows in the barn are giving 20 pounds of 5 per cent. milk, that's 20 pounds of butter milk; if they go to the pasture and give me 30 pounds of milk, that will mean more butter.

MR. BLACK: Isn't that different from what the experimental stations put out? A few years ago at the University of Wisconsin they were put in pasture, all kinds of pasture and there was no difference in the quality of the milk.

MR. WELD: That may be true, but the average dairyman of Pennsylvania is pretty apt to underfeed, and so the general condition in Pennsylvania is not what you find at the experiment station, where they know these things and take cognizance of them and take advantage of the knowledge and keep the animal up to her normal production.

MR. BLACK: But we want to reach something definite; can we change the quality of our milk?

MR. WELD: Through breeding we can increase it as shown by that chart—we can increase the pounds of butter fat. I increased the pounds of butter fat I got from that herd more than I did the pounds of milk that the animals produced, and that was through breeding, through the infusion of this Guernsey blood, for instance.

MR. BLACK: I had a book from the University of Wisconsin which says plainly that we cannot change the quality of milk.

MR. WAMBOLD: We are shipping milk from pure bred Holsteins to Philadelphia for the wholesale market. During March and April we had to add grain to our milk to keep it up to the required percentage of butter fat, because it is tested by the city. During May and June we had no difficulty. Also, we have found that the amount of fat on an animal will make a difference when she is officially tested, and an animal will vary 2 per cent. from one year to the next by the quantity of fat on her body.

MR. WELD: If the animal is fat, you say?

MR. WAMBOLD: Yes, abnormally fat. I know men who are testing pure bred Holsteins who will give their animals a long rest, get them abnormally fat and during the test, decrease the amount of feed for a short time so they will take the fat on their bodies to put in the milk, and they will get an abnormal percentage of butter fat.

MR. WELD: I have not worked that out at all, but I have done this which, in a way, substantiates what you say; in the past I have increased the weight of the animal, in other words, I have striven to keep them up in better condition, and that may account for part of the increase in the butter fat I have gotten out of the herd. I carry more weight on those animals now than in the beginning. I don't allow them to get thin if I can prevent it.

MR. HULL: Then we understand that your increase of butter fat has been through breeding rather than feeding?

MR. WELD: I think so, Mr. Hull.

MR. HULL: Well, I think that is generally conceded.

MR. WELD: That is what I attribute the increase to.

MR. STEWART: I just want to explain why I asked that question. It may not be interesting to all of you, but it is to me. I never went out to buy a cow in my life, but what I always found good ones; and when I have a cow to sell I must admit that she is always a good one. But I have been deceived and I expect I have deceived other people. We are testing milk now in our farmers' organization, and the reason I asked the question was this, that when I go out to buy a cow and the man who has the cow for sale says she is a good one, I say to him, "I want a sample of the milk to-morrow morning, I want to see you milk it from the cow and I want to test it." That will give me an idea of the value of that cow. Now, according to Mr. Weld's answer to my question, that will give me a pretty fair estimate of the value of that cow. It will tell me whether she gives 1 per cent. or 2 per cent. or 3 per cent. and so on, and I believe it is a pretty good basis upon which sales of cows should be made. They ought to be tested. If I have a cow that will show 4 per cent. of butter fat, would that be a good showing?

MR. WELD: It would.

MR. STEWART: And I know it, and she has been tested fair, I'll want a great big price for her and she's worth a big price and I don't deceive the man who buys her when I sell her upon that basis.

MR. CLARK: Do I understand Mr. Weld to say that in your breeding you can increase the amount of butter fat by calves that follow; not in the same cow?

Mr. WELD: Yes, that is my supposition, Mr. Clark.

MR. CLARK: That is what I want to know.

MR. WELD: Yes, sir. For instance, to be specific, first that 4,400 pound herd tested very low; some of the animals only tested two-nine, and upon that foundation I builded a herd through breeding and through selection, through eliminating those low fellows, so that now the average test is four-seven or four-eight.

DIRECTOR MARTIN: You would eliminate the feed; you said once in your talk that your herd stood still.

MR. WELD: Yes, sir.

DIRECTOR MARTIN: For a year or three years?

MR. WELD: One year.

DIRECTOR MARTIN: But you supplement that by saying that you were under-feeding that herd. Well, now, when you say through breeding, do we understand you to mean after the cow is fed up to her normal condition?

MR. WELD: Sure, that must be a foregone conclusion, and one of the first things I found when I went to investigating this work, the United States Government said, first be sure your animal is well fed, and that is a question every dairy man wants to ask himself, if he is giving the machine that he is working with, the kind and quantity and amount of material that she demands to make her maximum production.

MR. CLARK: After a cow is up in her normal condition, you then cannot change the amount of butter fat?

MR. WELD: That seems to be the best information that is given, but, through breeding, Mr. Clark, you can.

MR. DRAKE: In that period when you stood still, was it in quality or quantity?

MR. WELD: It was mostly in quantity.

MR. DRAKE: The quality remained practically the same?

MR. WELD: The quality remained practically the same, but I did not get so large a flow.

MR. DRAKE: When you bred those cows from 4,000 pounds up to 7,000 pounds, did they give you that quantity on the same feed?

MR. WELD: No, sir, they have got to have more food than the 4,000-pound cows; there is a greater machine at work; you have increased the capacity of the boiler, of the machine, it's got to have more fuel. It is not necessarily an increased expense, the net return will be greater. For instance, here is the result of last year; follow out that first line, which represents the production of the animal at the head of the herd last year; she made butter fat at a food cost of 20 cents a pound. She was the largest producer in the herd. Run down the line and you see the price increases, both per pound of butter fat and per 100 pounds of milk. The larger the production, the more economical the production and the lower the price of production per pound or per 100 pounds.

MR. BARNES: There is a question I would like brought out further. This gentleman shipping milk to Philadelphia, says his milk tests better after they go on grass. My experience is the same, and your cows test the other way. Can you give us any cause for that?

MR. WELD: Well, I could not analyze that, I don't know.

MR. WAMBOLD: We feed our cows through the winter, and also as the season advances, throughout the winter we increase the amount of protein in our ration, for the simple reason that we feel that the longer an animal is fed, it will increase in economical production; there will be a greater loss of protein in the excretions; also that animal will have a new coat in March and April and will use part of the richness of that feed to build up here system. Then we increase the amount of cottonseed meal and protein at that time and still we cannot keep up the amount of butter fat. This milk is tested by the city authorities, and when it goes below the standard required, we skim milk and put cream with it ,but when they go on grass, we have no trouble. I might say that this year the animals were in much better flesh than ever before and we did not have near as much trouble with the percentage of butter fat in the milk as in the past with the same cattle. We try to make the animals freshen in the fall and winter, but I suppose the majority of them do not freshen till nearly January.

MR. BLACK: At the University of Wisconsin, the cows don't test higher when they go on grass.

A Member: My experience has been that whenever we turn to pasture, the percentage of butter fat lowered in the milk. We try to have our cattle freshen the entire season through, some each month, but whenever we turn from stable feeding to pasture, the percentage of butter fat is lower, and I always receive the highest percentage of butter fat when my cattle are what we call stable fed, entirely. We feed ensilage but no other chopped grain.

MR. HULL: Sometimes changes in conditions will make differences that we do not take account of; there is nothing mysterious about it. Sometimes there's an introduction of Channel Island cows in the herd that will change conditions. Sometimes there will be a cow come in that gives a richer percentage of butter fat, or a less, and these things often make changes in conditions that we cannot account for.

MR. BILLINGS: In our home herd we are testing our cows individually, just as Mr. Weld has done, and have been doing it for years, and the greater portion of those cows, when we turn them into grass, the percentage of fat will increase as well as the flow of milk. We tested our cows last Monday and they had not been into grass but a week, and in some cases the percentage of butter fat increased one per cent.

A Member: This butter fat does not affect the amount per cow per day, does it? It is only the percentage in milk, only the butter fat is reduced in the percentage of milk?

MR. BILLINGS: We are figuring the butter fat on the percentage of butter fat; we get more butter fat if the cow is fed just the same, but our herd on an average was increased—the percentage of butter fat and the quantity of milk.

A Member: There is more water in your milk; you don't lose anything?

MR. BILLINGS: No, we always gain in quantity.

MR. CARD: I merely wanted to emphasize one point that Mr. Weld brought out in the earlier part of his talk. He said he increased that yield from 186 pounds, if I remember, to 338, in some 18 years, and his expense for improving the stock was $220, if I remember. I think that is a point well worth emphasizing in Institute work, and I want to cite my own experience along a similar line. Some 15 or 16 years ago, when I took charge of my farm, I got on it 6 common cows from the community. The first year we used a pure bred sire of another breed that was available. Since then I have used constantly one breed. Now there are ten pure bred animals giving milk, and about as many younger animals, pure bred. The herd is uniform in appearance. I challenge anyone to pick out the grades from the pure breds, and that has been accomplished at about the same cost for pure bred stock which Mr. Weld has put in his herd during that time, and the sale of animals has replaced that, as in his case. It seems to me it is an important point.

The CHAIRMAN: We will hear from Dr. Louis A. Klein, Dean of the School of Veterinary Medicine, University of Pennsylvania, on the "Principles of Sanitary Milk Production."

Dr. Klein spoke as follows:

## PRINCIPLES OF SANITARY MILK PRODUCTION

By DR. L. A. KLEIN, *Philadelphia.*

Mr. Chairman, Ladies and Gentlemen: I just arrived here and did not expect to be called on quite so soon and am a little out of breath from climbing the stairs at the Court House—I understood that this meeting was being held at that place and went there first, and we went into about every room before I discovered that I was in the wrong place.

The subject that I am to discuss, is the "Principles of Sanitary Milk Production." I will endeavor to mention the conditions which are concerned in the production of what is known as sanitary milk. We have, in milk, one of our most valuable foods. It contains all of the nutritive substances necessary for the nourishment of the animal body, the human body—including growth; and then, too, these substances are present in a form which makes them readily digestible, a condition which makes milk a very valuable food for invalids and for infants and for other individuals with a weak digestion.

Now, for these very same reasons, milk is also a good substance for the growth of bacteria, on account of the various food elements which it contains. It meets the food requirements of a large number of species of bacteria; and then the accessibility in which these substances are present, makes the conditions very favorable for the multiplication of bacteria. So the same conditions which make milk valuable as a food, also make it a good substance in which bacteria may grow. Now, when bacteria live in milk, growing and multiplying, they live upon these nutritive substances which the milk contains, and in doing this they use them up, break them up into other compounds and produce new compounds, new substances. Some of these substances which are produced in this way bring about perceptible changes in the milk, changes which are visible to the eye. They produce, for instance, souring, curdling, and give the milk off flavors, bad taste, bad odors. Others of these substances have an injurious effect upon the digestive tract of man, especially when the milk is used by infants or persons with weak digestion, and these substances which have this effect upon the digestive organs of man may be present in the milk without the milk showing any visible change. The bacteria which may be found in milk are very well known, where they come from and how they get into the milk, and the conditions which are favorable to their growth and multiplication are equally well known. We know quite as much about the different species of bacteria as is known about the different species of domestic animals—quite as much.

Now the bacteria which may be found in milk can be divided into two great classes: One class including those species which produce disease, which are commonly associated with disease, and the other class including those species which are present without the existence of disease—they have nothing to do directly with the production of disease. Now, if the milk is drawn from healthy cows and does not come in contact with diseased persons, we will have none of the disease producing organisms present. The organisms which do not produce disease directly, however, are always present in milk to a greater or less extent. This is so because these bacteria are material to the surroundings of the cow, they belong to the things that surround the cow. We find them, for instance, in the manure of the cow. We find them in the dust that is on the fodder and on the bedding, in the dust of the pasture and the dust of the barnyard. We find them in the milk vessels. We find them on the skin of the cow. They are in the teats of the udder of the cow. We find them on the hands of milker, on the clothing of the milker. They exist in all of the surroundings of the cow, so they are present always to a greater or less degree in milk. Now, these bacteria, while they are harmless in themselves, while they do not in themselves, produce disease, while they do not in themselves produce any injurious effect, some of them bring about changes in the milk which are objectionable, either because of the odor or the taste, and some of these changes are injurious. The most objectionable change is produced by the bacteria which come from the manure, and these bacteria are also found, as we would naturally expect, upon the skin of the cow. Next in order, the most objectionable change is produced by the bacteria which exist in the dust, on the hay and the fodder, and the dust of the ground, the pasture or the barnyard. We have also in this group some of the bacteria which are commonly found in the teats of the udder. The bacteria which live in the milk vessels, in the particles of milk which sometimes remain in the milk vessels, bring about a change which is not very objectionable, in fact sometimes it is a change that we want to take place; it is the change that occurs when we have what is known as the ripening of cream, that is, a simple souring of the milk. This change of course renders the milk unsuitable for certain purposes, but it is not at all harmful and in some instances this change is brought about in milk by adding these very bacteria purposely for the purpose of ripening cream to make butter, for the purpose of making what is known as acid milk for which there is at present quite a demand in some of the larger cities. Now, if milk is to keep well, if it is to retain its natural taste and flavor and these changes are to be held back or retarded, we must make an opportunity to keep these bacteria or the dirt in which they are contained, out of the milk.

Now it is important of course that the milk be cooled as soon as possible after drawing and that it be kept cool during transportation to town and during delivery in town, and also that it be taken care of properly by the consumer. These things are all necessary, but the most important of all is to prevent the milk from being contaminated at the point of production. This is the most important because if it is not attended to, subsequent care cannot have much effect in improving the keeping quality of the milk. Now, how this can be done is very well known. It is a matter that has been the subject of investigation for a number of years.

A number of methods have been tried and tested and the best of these have been selected and these better methods have been in use for a long time under every day practical conditions, so that when we take up the question of keeping dirt or bacteria out of milk at the point of production, we have an abundant amount of practical experience to guide us; we are not treading upon any untried ground. We cannot expect to keep bacteria out of milk with a strainer. The strainer will keep out the large particles of dirt, but the dirt that is soluble and the bacteria on the dirt which is held out by the strainer will be washed out and washed through into the milk. Neither is it possible to keep all bacteria out of milk under conditions which must prevail in even a good dairy barn; and it is not necessary to keep all of the bacteria out of milk, but it is desirable, it is desirable from the standpoint of the producer and the dealer and the consumer to keep down the number of bacteria or keep down the quantity of dirt to the lowest possible amount consistent with practical conditions.

Now this can be done by milking under clean conditions, by protecting the milk from contamination by dust or odors, by cooling the milk promptly and keeping it cool and by using clean milk vessels. These are the essentials. Keeping the stable clean will assist in keeping the air free from dust and free from odor, and it will also help to keep the cows clean. Now this is done usually by removing the manure from the stable twice a day, if possible, before milking; once a day, anyhow, and by keeping the window sill and the stall fittings and the ceiling and the walls brushed free from dust. If the cows are cleaned, that is to say, if the dirt which is upon the skin of the cow, especially upon the hind quarters ,the flanks, the udder and the tail, if the dirt there is loosened up with a curry comb and then brushed off as clean as possible with a brush when the cow is milked, there will be very few particles of manure, very little scurf, very few loose hairs to fall off and possibly fall into the milk pail. If the udder is wiped with a damp cloth, the few loose particles that remain after the brushing will be wiped off, or, if not wiped, they will be stuck fast so that they will not be likely to drop off into the milk pail. The cleaning of the stable, however, must be done and also the cleaning of the cow must be done a sufficient time before milking to allow time for the odor and the dust to go out of the air of the stable before milking is begun. The cleaning of the stable should be done first and then the cleaning of the cow and then the wiping of the udder. The udder should not be wiped until just before milking, because you want the udder damp while the cow is being milked, not wet—if you have the udder wet, if there is any free water on the surface of the skin of the udder, it will run down to the end of the tip and be worked off with the fingers and dropped into the milk, and conditions will be much worse than if the udder had not been wiped at all. Washing the udder is not necessary unless you are aiming to produce a very high quality of milk, and when the udder is washed, it is necessary that it be dry when milking is begun, because if it is not dry, the water will run down to the end of the teat and drop off into the milk bucket, and if the udder is not wiped dry after being washed in cold weather, you will have the skin of the teats cracking and chapping and have considerable trouble from that source.

Now the motions of milking the cow, the motions that are set up into the udder and the flanks when the teats are taken hold of and the milk drawn, will have a tendency to shake loose anything that is loose upon the skin, any dirt that is there, any loosened scurf on the skin, and these things will be there unless the cow has been brushed. This action of the udder will shake it loose and it will fall downward.

The old fashioned milk pail, with the wide top, offers a very good receptacle for catching a great deal of this dirt that falls from the body of the cow. On the other hand, what is known as the covered top pail, which has all of the top covered except a space about seven inches in diameter. If such a pail is used for milking, a great deal of this dust which may fall down from the body of the cow will be kept out of the milk. There are two types of covered top pails; there is one known as the hooded pail, which has a hood over the top and the opening at the side. The opening is upright and at the side, and then there is the other type of covered top pail in which the top is rather flat, slightly rounded, but rather flat, and the opening is in this and is rather flat. Now of course the hooded pail with the upright opening will catch less dirt than the pail with the flat opening, even when the pail with the flat opening has a cheese cloth strainer in it; fewer bacteria will go through into the milk in the hooded pail than in this pail with a flat opening, even when it has a cheese cloth strainer in it. On the other hand, however, the hooded pail is much more difficult to milk into than the pail with the flat top opening, and the pail with the flat top opening and the cheese cloth strainer, even though it is not as good as the hooded pail, is a very great improvement over the common open pail. It has been found by actual test, not once but a number of times, that this covered top pail with a flat opening and cheese cloth strainer will keep out of the milk from thirty to ninety per cent. of the bacteria that will go into the milk when it is milked into an open top pail. Of all the things which can be done to reduce the amount of dirt or bacteria which go into the milk during the act of milking, there isn't anyone which will do more than the use of the covered top pail; that is a fact that is well demonstrated.

MR. HULL: Don't it increase the amount of time in milking to put the milk in a small opening?

DR. KLEIN: It will at first. Anyone who is accustomed to using an open top pail will have difficulty at first in using the covered top pail and they won't like it, but after a time I believe that the covered top pail with the flat opening seven inches in diameter will be found as convenient to the man who attends to his business and looks at what he is doing, as will the open top pail. A man cannot milk in a covered top pail and look around the barn; he has to keep his eye right on his work, and that is difficult at first, but there isn't any part of labor—of course everything connected with the production of sanitary milk means additional labor, but there isn't any part of this additional labor which seems to give greater compensation for the amount of labor involved than the adoption of this covered top pail.

MR. HULL: There is another point as you are passing on which I would like information. After the milk has been drawn, what degree of coldness is required to prevent a further increase of bacteria?

DR. KLEIN: I will take that up later. Now, in cleaning the stable and cleaning the cows, the hands become soiled with material that is rich in bacteria, very rich in bacteria; and if milking is begun with the hands in this condition, some of this material is going to get into the milk,and if the practice is followed of wetting the hands while milking, then a great deal of it is going to be washed into the milk. Now, for this reason, it is recommended that immediately before milking, the milker wash his hands clean with soap and water and then dry them—dry them thoroughly, because it is necessary to milk with dry hands to get the best results from a sanitary standpoint.

In some dairies where they aim to produce a high grade of milk which sells at a premium in the market, the milker washes his hands after milking each cow. Now, to any of you who have not had an opportunity to observe this method, you may think that this sounds like a great waste of time, but it really takes a very little time. This has two results, it helps to reduce the bacteria in the milk and it also tends to prevent the spread of some diseases, the infection of which is carried from one cow to another on the hands of the milker, so that it is an advantage in two respects.

In cleaning the cows and cleaning the stable, the clothing will become dusty and soiled, and when the man sits down to milk, some of this dust, especially that upon the sleeves and the upper part of the body is going to be shaken off and shaken into the air just above the milk bucket, and some of it may go into the milk pail and thus get into the milk. Now this may be avoided by having in the barn a jumper and overalls and a cap to put on when the man begins to milk. A special suit need not necessarily be kept for this purpose. Almost every man uses his overalls in the work around the farm and a suit consisting of a jumper and overalls can be used one week in the barn to milk and then the next week it can be taken for other work and then go to the wash and come from the wash back into the barn for use in milking the first week and go to the other work the second week. In dairies that produce the high grades of milk, what is usually known as certified milk, these suits are made of duck, white duck. They have them white so that if they are soiled the dirt will be readily apparent, but any hard smooth material that does not have a rough surface will answer the same purpose. It need not necessarily be white. These certified dairies—there is one dairy that I am familiar with where the men have a clean suit each milking. In other places they have a clean suit every two or three days. In some places they use them a week; but of course certified dairies are dairies that are producing milk which brings a higher price on the market than ordinary milk. Bacteria are nearly always present in the lower part of the teat of the udder, and when the first milk is drawn from the udder, the greater part of these are washed out so that the first few streams of milk will contain usually a far greater number of bacteria than the milk that comes afterwards; so it has been found that if these first two or three streams of milk, commonly called the fore milk, are drawn off into a separate vessel before milking is begun, that the milk will then have a much lower bacteria content than when the fore milk is put into the regular milk pail. Now, milk has another peculiarity which must be recognized and that is that it absorbs odors very readily, very readily, and it will absorb odors more readily when it is warm, as when it comes from the cow, than when it is cold, and so we find that if milk is drawn from the cow and stored in a can in the stable with the top off, if the odor of that stable has the odor of manure, then the milk will be tainted and wil have the taste or odor of manure.

This, therefore, suggested the advisability of removing the milk as soon as it was drawn from the cow to a place outside of the cow stable, into what is usually called a milk room. When milk comes from the cow it is at about body temperature, that is the body temperature of the cow will average 101 1-2 degrees Fahrenheit and the milk will be very near up to that temperature. It is a temperature that is very favorable to the growth of bacteria; they will multiply much faster at this temperature than at a lower temperature, and most of them will multiply much faster at this temperature than at a higher temperature, so this is probably the most favorable temperature for the growth of bacteria. Now, if we lower this temperature to 60 degrees F. or below—and every degree below sixty will make a big difference—if we lower the temperature, we will retard or slow up the multiplication of the bacteria and make the milk keep a great deal longer.

This is best done by having a milk cooler or, as it is sometimes called, an aerator. If milk is carried from the barn or cow stable in which it is drawn, into a milk room and poured over a cooler, that milk will be brought down to within two degrees of the cooling fluid in a very few minutes after it has been taken from the cow; that is to say, if you have spring water or well water at 50 degrees that you can run through a cooler, and within a very few minutes after taking the milk from your cow, you run it over that cooler, the milk will be brought down to 52 degrees and that will have a great effect upon the keeping qualities of the milk, because it will have a great effect in slowing down the multiplication or increase in the numbers of bacteria. Now, if you pour the milk into a milk can and put the milk can in a tank of cold water, this will also bring down the temperature, but it will bring it down much more slower, the milk will remain for a much longer time at a high temperature, which is not only very favorable to the increase of all bacteria, but is especially favorable to the increased of those bacteria which are the most objectionable, the bacteria which come from the manure and the bacteria which come from the fodder, the hay-dust, the dust of the soil and also for any disease producing bacteria that may be in the milk.

MR. HULL: Will 52 degrees prevent any future increase of bacteria?

DR. KLEIN: There will always be some increase in bacteria as long as the milk is above the freezing point, but when you get the temperature down to 60, you slow up the growth of bacteria very considerably, especially the objectionable kind; the milk-souring bacteria will grow better at 60 than the other kind, but they are the least objectionable. When you get any degree below 60, you slow up the growth more and more until, when you get down to 32, it stops; but milk that is cooled immediately after being drawn from the cow to 52 degrees, if produced under conditions which keep out the original contaminating bacteria, keep out the dirt, will keep for four or five days, if you get milk from a cow that has been clean milked in a clean barn by clean hands into a clean milk vessel and immediately run over the cooler, if you can bring that milk down to 52 or even 56 degrees and keep it at that temperature, you can keep it four or five days.

Now, flies. Flies may introduce a great many bacteria into milk. How many they will introduce and what kind will depend altogether on what the fly has been crawling over before it drops into the milk, so for this reason, the room where the milk is cooled or stored or handled in any way ought to be screened. Now some sanitarians think that the barn, the cow stable, ought also to be screened. I am not certain that that is a good thing. Of course screens on a cow stable will keep flies from flying into the window or in through the doors, but they will not keep out the flies which are on the body of the cow when the cow is brought into the stable, and that is, I think, the largest source of flies in a cow barn, the flies that are brought in on the cows body. Screening the barn will not keep those out more than it will keep them in; so, for that reason, I am not certain that screening the barn is necessary or ever advisable; but I am quite convinced that it is advisable to screen the room where the milk is to be cooled or handled in any way, and whatever else may be done to keep down the flies or keep out the flies or keep out the flies ought to be done. A clean barn will be much less attractive to flies than one that is not clean, so that some of the other things that I have recommended for the production of sanitary milk, will also help in this respect.

If the milk vessels are used, they ought to be immediately cleaned and thoroughly cleaned. It may some times happen that these vessels may be rinsed and washed in water with soap powder and it may be thought that they are quite clean, and to the eye they may be clean, but they may contain small particles of milk which are inhabited by bacteria, and if these are allowed to remain in the milk pail until the next time it is used, they are going to be increased very greatly in number and the first milk that is put into that pail is going to take them up and carry them along. It is well known that sunning milk vessels helps to keep them sweet, helps to keep the sour odors of milk out of them. Well, this is merely because the sunlight destroys some of the bacteria. Now, if milk vessels, after being cleaned, are scalded with boiling water, any bacteria which may remain after the vessels have been apparently cleaned, will be killed—not all of them, but most of them will be killed. Better results would be obtained if the milk vessels were placed in a sterilizer or steam chest, but these things cannot be had on every farm, they are only practical on the large places, but where they are not available, scalding with boiling water is the next best thing and ought to be done. The milk vessel after being cleaned, ought never to be wiped out with a cloth; it ought to be stood upside down where it can drain off, and if this can be a sunny place, so much the better, but it ought to be a place free from dust because dust is objectionable, not because it is dust, but because it contains bacteria which, when they grow, bring about decomposition. When hay and other dried products or when bedding is put down into a barn, the air of the barn becomes filled with the dust from these substances. If milking is done at that time, some of this dust is going to settle into the milk pail, so it has been found best to put down the dry product and the bedding after the milking has been finished; and this also applies to meal and grain, although there is less dust distributed by the meal and the grain than by the dry fodder and bedding. If ensilage or beets or turnips or cabbage or any of those feeds which have an odor are fed just before or during milking, the odor of those substances is going to get into the atmosphere of the stable, and when you milk, the milk is going to absorb that odor and it will have the taste of the substance which was fed. When ensilage was first introduced, this was not understood, and when it was fed just before milking or during milking, the milk acquired the odor of it and the taste of the ensilage, and this fact brought ensilage for a time into disrepute as food for cattle; in fact it has only been within the last year that one of the largest dealers in New York City would accept milk from a herd that was fed on ensilage; but if the ensilage is fed after the milking, there will be no flavor given by it to the milk and this will also apply to those other substances which have a characteristic odor.

Now, as I have mentioned, these various things which are recommended as being benefical in the production of certified milk, take time. It is estimated that it will take on the average five minutes per cow to clean the cow; three minutes per cow to clean the stable; two minutes per cow to wipe the udder; two minutes per cow to carry the milk to the milk room and come back again for the next; one minute per cow for scalding the milk vessels; that makes a total of 15 minutes per cow per day. Now, in return for this additional time there will be some increase in milk production. We have the authority of some very good dairy man that if a cow is kept clean and comfortable, she will give more milk for the same feed than when she is not kept clean and comfortable. That is not the opinion of one man, but it represents the results that have been obtained by a number of men in every day experience, not under experimental conditions, so that the dairyman has this result to look forward to. Then there is also the effect upon the flavor and keeping quality of the milk, and if the milk is used for making butter or cheese, the flavor is a very important point. I thank you all for your attention.

A Member: Nearly everybody takes fluid at their meals. I have in mind a patient whom the doctor said shouldn't drink coffee. Later on, another doctor was called in and recommended tea. The next doctor was called in and said he shouldn't drink tea at all but should drink milk. A fourth doctor was called in and said he shouldn't drink milk because it would bring on billiousness. Is that a settled fact, that milk will produce biliousness, if used at every meal, during meal time?

DR. KLEIN: Well, I can answer that question from my own experience, I can say this, that when ever I drink whole milk, it makes me billious, but if I drink the milk skimmed, I can drink all I want, either with meals or between meals, and it does very well. On the other hand, I have a friend who tells me that if he drinks skimmed milk, it makes him bilious, but if he drinks whole milk, he gets along all right.

A Member: What is the comparative influence of hand milking and machine milking on bacteria?

DR. KLEIN: That will depend altogether upon the conditions under which the machine is used.

A Member: I mean with care in the preparation of the machine, steaming, scalding and extreme care taken in both cases.

DR. KLEIN: You cannot make any broad comparison; the worst milk that I have met with in the last two years was produced by machine milking, but that was not the fault of the milking machine, it was the fault of the conditions under which the machine was used.

A Member: Can rubber hose be kept sterilized?

DR. KLEIN.: Yes, but it would be difficult to do so without using preservatives, and if you used preservatives, rubber hose is not very suitable to run milk through which is to be used for food purposes, but I think the matter of the milking is rather a broad question and is not a question that can be answered yes or no; you have got to consider conditions and the machine; I am not familiar with but one machine and am not very familiar with that machine, but in the case I mention, the man who was using the machine made the mistake, after he finished milking, of running steam through the tubing of the machine. Now, this merely coagulated or dried certain particles of the milk and made them stick to the inner side of the tubing, and then some bacteria which remained there, which had not been brought intimately enough in contact with the steam to be killed, began to multiply so that, by the time the machine was used for the next milking, there were quite a large number of bacteria present in these tubes and of course they were washed into the milk, and then this man seemed to expect that the milking machine would do everything, he had not cleaned his cows, because he had not cleaned the udders; I saw places where the udders had long hairs on them, which is one thing I had not mentioned, that in keeping cows clean it will be found of very great assistance if the long hairs on the udders and flanks are kept clipped short; this will help very greatly in keeping these parts of the cows body clean. This man had not done that. The hair on the udder was quite long and the manure, when soft, had run down the ends of the hair and matted half a dozen of them together and when he put on the milking cup, he put it right up over the ends of those hairs. When suction started, you can imagine what happened to the manure on the ends of those hairs.

A Member: What would be the proper method of cleaning the machine?

DR. KLEIN: This manufacturer who put out the machine I spoke of recommended that after they were cleaned, they be put in lime water. In regard to cleaning, the same thing will apply to milking machines that applies to every thing else used for milk—they ought to be rinsed out first with water that is not too hot. It may be lukewarm or cold, but it must not be hot enough to dry or coagulate some of the substances that are in the milk and make them stick to the vessel. Use cold or lukewarm water first and then hot water. He made the mistake of using the hot water to begin with. If you go that far with the milking machine, the various manufacturers recommend different methods. The manufacturer of this machine recommended that after the tubes were cleaned, the rubber parts be laid in lime water. That seems to me like a very good arrangement, although I don't know that it has ever been tested thoroughly to determine whether it is absolutely effective, but when the milking machines were put out first some of the manufacturers recommended that after you clean the tubes, you lay them in a three per cent solution of formaldehyde. That would prevent the growth of bacteria in the tube but would be very hard on the rubber, and what is going to happen when the first milk is run through those tubes? Of course the tubes can be rinsed out with water, but can this be done thoroughly enough to remove this preservative? The most serious problem, I believe, in using the milking machine, has been found right at this point, keeping the tubes clean, but there have been a great many serious problems that have been overcome by inventors, and it may be that this one will be overcome. I do not wish to say anything against the milking machine because I have nothing against it, but as to saying broadly whether the best milk has been obtained with the milking machine or by hand milking, I cannot answer that question, yes or no, I can only say that a good, careful man can probably produce as good milk by hand milking as he can with the milking machine.

A Member: In reference to the handling of milk, in Lancaster, our home town, quite a number of our dairymen take good care of their herds, clean their stables and cattle and try to produce a high quality of milk. There is a milk company there that pasteurizes their milk, and I have been told that the good, bad and indifferent milk is all pasteurized together and the man who takes decent care of his herd, does not get any more for his milk than the man who does not. Now what inducement is there to be careful?

Another question I would like to ask is this—is pasteurized milk as digestible as milk that is not pasteurized? My physician tells me it is not. It is a question of dollars and cents with us. Plenty of farmers will take care of their herds of cattle and produce as good milk as anybody could wish if you are willing to pay for it.

DR. KLEIN: The first part of your question touches on the commercial side, and I am not discussing that subject, I am merely talking about the production of sanitary milk, now the marketing of sanitary milk is another question. In regard to the other point, as to whether pasteurized milk is less digestible than raw milk, I can say this, that there has been quite a few experiments made to determine that point and in the beginning, most of the experiments seemed to indicate that the pasteurized was less digestible than raw milk. That was because, in the beginning the milk was heated up to 179 degrees or in some instances was boiled. More recently however, it has been found desirable to heat milk to 145 degrees. Many believe to-day that this will kill all the disease producing organisms in the milk, although that point is not absolutely settled, but when milk is heated up to 145 degrees for thirty minutes, it appears to be just as digestable as raw milk.

A Member: It is as palatable?

DR. KLEIN: If you change from raw milk to milk that has been heated to 145 degrees for thirty minutes, you will notice a difference in the taste and you may not like the taste as well, but after you get used to that taste, you will not notice it; that is to say, you can become accustomed to the taste of milk heated in this manner just as well as you can become accustomed to the taste of milk that is raw, but there is one thing that must be remembered, pasteurizing will not make bad milk good. Bacteria in milk, that is, those that are not disease producing, are not objectionable because they are bacteria, but they are objectionable because of the changes they bring about in the milk constituents, they are objectionable because of some of the products they produce. Now then, if these bacteria have had an opportunity to grow in the milk and produce these products, it becomes a question then as to whether pasteurization is going to destroy those products, not whether pasteurization is going to destroy the bacteria, and it is by no means certain that heating milk to 145 degrees F. for thirty minutes will break up these products, the most injurious ones; and then there is one thing about the pasteurization of milk—the word pasteurization applied to milk has no particular meaning; one man may sell you pasteurized milk and it may be milk that has been heated to 145 degrees just for a minute or two; another man may sell you pasteurized milk and it may be milk that has been heated to 145 or 150 degrees for thirty minutes or even 50 minutes; they never go above this point, because if they do, it will destroy the cream rise.

A Member: Will there be any difference in the condition of ice cream made from pasteurized cream or cream not pasteurized? Will it change the taste or healthfulness of the cream?

DR. KLEIN: I could not answer that question; I know nothing whatever about making ice cream.

DIRECTOR MARTIN: The questions indicate that you are much interested in this subject, but we have overrun the time. The next topic is "The Horseshoe Considered as The Base of Support of the Leg," by Dr. John W. Adams, of the School of Veterinary Medicine, University of Pennsylvania; but it will not be fair to Dr. Adams to have him begin now and drop off at 12 o'clock, and we are up to two or three problems here: The afternoon session is pretty full and the courtesies of the people resident in Washington have been extended to us about 4 o'clock to take us on a trip to see some of the beautiful farms in this vicinity and visit the fair grounds. Now, what we want to learn is if the audience can return to this hall at one o'clock, at which time Dr. Adams will deliver his address, and then the regular program for this afternoon will follow? As many as can be here at 1 o'clock, hold up your hands.

(The major portion of the audience held up their hands and recess was taken until 1 P. M.)

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Wednesday, May 21, 1913. 1 P. M.

Mr. J. W. Stewart, Jefferson, Pa., Chairman.

The CHAIRMAN: Ladies and Gentlemen and Members of the Institute: The full program that we have for this afternoon in connection with what was left over from the forenoon, precludes the privilege of the Chairman uttering a word at the beginning of this session of the Institute. You know the Chairman often has to fill in time that nobody else can, and he has to do a good many things in this Institute work that nobody else can do. Permit me to say to the Board of Agriculture, however, that I appreciate the fact that this meeting is called in the City of Washington, being near to my home and the county which I come from, giving an opportunity for Greene county farmers to attend, the first they have ever had, in my knowledge. A number of them are present and will be present.

Let me say to you, just in a word. One hundred and seventeen years ago Greene county was a part of Washington county, the same people, the same race of people are residents of both sections. We are identical in many respects, the same race of people, the same soil, the same farm products and so on, and the only difference I could think of at present between a Greene county farmer and a Washington county farmer is, that in speaking of this separation, the Washington county farmer would say that Green county was cut off from Washington and the Greene county farmer would say respectfully that Washington was cut off from Greene.

Now, with these jesting remarks, let me introduce to you, first, Dr. John W. Adams, of the School of Veterinary Medicine, University of Pennsylvania, who will address us on the "Horseshoe Considered as the Base of Support of the Leg." I am advised to divide the time between these speakers this afternoon as nearly equally as I possibly can, so if I notify the speaker that his time is about expired, he will not think strange. I want to suggest right now that those of you who have any questions to ask. I want you to get up on your feet and ask them. I tell you that the time has passed, fellow-farmers, when a man can sit upon his seat and ask a question and not ask it very distinctly. Get up and speak out loud so that you can be heard, so that my friend here can get all the facts. I take pleasure in introducing Dr. Adams.

Dr. Adams spoke as follows:

## THE HORSESHOE CONSIDERED AS THE BASE OF SUPPORT OF THE LEG.

By DR. JOHN W. ADAMS, *Philadelphia.*

Mr. Chairman and Ladies and Gentlemen: I am quite grateful to the Chairman for putting me off until this afternoon. I was quite perturbed this morning when I felt that possibly I would have to say what I had to in about ten or fifteen minutes. I felt that I would be in the position of the Santa Fe railroad agent, if that were the case. They sent a young man from Pennsylvania way out to Arizona to take charge of a railway station. He was not familiar with the country or anything out there, and at the end of the first month, having received a shipment of a burro, he sent in his report, "One bureau short, one jackass over." I thought that was the position I would be in this morning.

I am to talk to you of the horseshoe regarded as the base of support for the legs. When I received the notice of this meeting, I was not misinformed, but I misinterpreted the call and thought I was to address a meeting of Institute instructors or teachers. Yesterday, however, I learned that I was to address a Farmers' Institute; then I realized for the first time that what I had intended to say was altogether too technical for this audience and therefore I changed the text of my sermon. Now you naturally would not expect much of a sermon after a change so recent as that; however, the University professors are supposed to be very versatile. I am a good deal like the servant of the old Scotch minister. He said, "Your reverence, I have been with you thirty years and have heard every sermon you have preached in that time and I think I could preach from any text in the Bible." The minister said, "James, what would you say to this text, 'The wild ass paweth the ground, and snuffeth up the air of the wilderness, and lifeth up his head in fury?"' He said, "I'd say it would be a long time before he'd get fat."

I am going to talk to you about the care of the colts and horses upon the farm. The ordinary layman's supervision of the hoofs of the colts and horses that work upon the farm is a very important question, because, during the first year of the colt's life, when the bones are growing, they are soft and, within certain lines, they are plastic and can be molded into those forms which they must retain during the rest of their life—the rest of the colt's life. Professor Meller, in 1881, while a professor at Stuttgart, showed, by experiment, that he could take a weaning colt and by leaving the outer half of the wall too long so that the outer half of the foot always struck the ground first and then was settled to the inner half of the foot, he could rotate the lower end of the long pastern to 10 degrees of the complete circle.

Now you know that there are three bones below the fetlock and two joints below the fetlock. The fetlock joint is a perfect hinged joint, so constructed that the long pastern, the first bone below the fetlock must extend and flex; in other words it must sweep in the plane of a circle, and that plane should always be parallel to the line of progression; in other words when you view the colt from the front, the legs should be perpendicular from the knee joint to the ground and those joints all flex and extend in a plane and that plane of flexion and extension should always be parallel to the line of progression. If that is the case, as you see the colt coming to you or going from you, the feet simply seem to rise and fall perpendicularly and drop perpendicularly to the ground. They swing neither inward nor outward, but if the colt's toes be pointed outward or inward, that means a rotation of all those hinged joints from the shoulder joints, therefore they flex and extend, not in a plane parallel with the line of progression, but in a plane which cuts the line of progression.

Suppose the toes are turned in, the elbows are out from the ribs—the so-called pigeon-toed horse—what is the flight of his foot as he comes toward you? The foot is raised from the ground, because the leg has to be shortened for the sweep forward, otherwise it would dig into the ground. It is raised from the ground and at the same time it is brought forward, and as the plane of the exing is oblique to the line of progression, the foot is carried forward and seems to sweep out during the first half of the stride and then inward to the ground during the second half, and that horse is said to paddle or wing out. When the toes are out, he flexes in carrying his foot forward and inward during the first half of the stride, and forward and outward to the ground, striking the ground on the outer toe during the second half of the stride, and is said to interfere or travel close; but the pigeon toed horse wings out, flexes outward, as he carries the leg forward and paddles, so it is desirable that the colt shall stand perpendicular, neither outward nor inward.

We know that they are often born with toes pointing outward or inward and we must realize that the colt whose toes point outward has too much weight on the inner half of the foot, that the inner half of the horn-secreting structure is relatively aenemic and grows horn more slowly than it should; whereas the colt that stands with his feet close together or pigeontoed, has a greater amount of pressure on the horn-secreting structure in the outer half of his foot, which is relatively anaemic and grows horns more slowly than it should; whereas, the colt that stands with his feet close together or pigeontoed has a greater amount of pressure on the horn secreting structure in the outer half of his foot, which is relatively anaemic and grows horn more slowly than it should. In either case, the side of the hoof that grows horn with normal rapidity soon becomes too long, so that the tendency of a splay footed colt is to develop too long an outer wall, and the more widely they carry their toes apart in order to gain a comfortable base of support, and this lengthening of the outside causes them, in traveling, to strike the outside first, the long outside, then the weight settles down upon the inside. The result of the weight settling on the inner half of the foot is to cause an absorption of the thin, sharp edge of the inner half of the hoof bone. The result is that the joint surface is no longer horizontal but is lower on the inside than on the outside, under the weight; as the long pastern settles down, it bears heavily on the outside of the joint and lightly on the inside, and the result is a twisting or tortion of the long pastern.

If you cannot follow me, all you need to remember is that so long as the toes point straight ahead, the bearing is evenly distributed over the joint surfaces of the fetlock and coronary joint and hoof joint; but as soon as you allow the outer walls to become too long or the horse to become pigeon-toed, or the inner wall to become too long, you get a joint that is not level and get a twisted pastern. If a colt becomes two years old with a twisted pastern, he's got it forever. Professors Meller and Longwitch, along about 1888, as I said before, experimentally caused tortion of the long pastern of colts; Professor Longwitch through 8 degrees and Professor Meller through 10 degrees, and then took other colts and twisted their pasterns and tried during the second year, to straighten them up again, and found it took about twice as long to straighten the pastern of a colt that had arrived at one year of age as it did to crook the pastern of a weanling colt that had arrived at one year of age with a bad standing position and crooked pastern.

You can still, during the second and third years, by judicious trimming of the foot, do much to correct the condition. If the colt is running on a sandy soil with its mother, the wear ought to be and often is in rapidity equal to the growth. Now colts grow about an inch in three months or two and a half months; in other words, about a quarter to a third of an inch in a month is the rate of growth of the hoof upon a sandy soil. The wear may be equally rapid with the growth and they may keep themselves perfectly level, but if the colt is stabled much or runs on a soft loam or in low pasture, it often happens that the wear is not as rapid as the growth and the hoof becomes too long.

What is the disadvantage of an extra long hoof in a colt? If we exaggerate, we can see what excessive length does in changing the shape of a hoof. Here is the hoof of a horse. This horse shows that the hoof has taken something life four years of growth. Here the hoof bone is taken out here and then he still stood on that part of his foot. The ground pressure on the long foot will always turn the toe up so that when the colt's foot becomes overgrown, it soon begins to become concave at the toe. At the same time, the frog no longer reaches the ground, because the horny growth only grows down a certain distance and stops. Just as soon as the frog loses all pressure, it does not functionate. As soon as the wall grows so long that the frog does not touch the ground, its horn secreting structure is bloodless and horn production is very slow so, in the long foot, we find the frog high up in the foot and the quarters curl in and cover over the space that should be occupied by the frog.

Here you can see where the frog is. There is the frog there, but down below, the horn has covered it over, so that long feet become twisted in various directions they become concave at the toe when viewed from the side, sometimes twist laterally, so that looking at the foot from in front or behind, one wall is convex and the other is concave. In either case, the long hoof exercises a very injurious leverage upon the ligaments which surround the joints of the leg below the fetlock; so that the long foot, by its excessive leverage and pulling on the flexor or middle tendon in the back of the leg, makes the animal's toe sore and he begins to cop or zuckle at the fetlock, so that the long foot produces zuckling at the fetlock, boney growths behind the coronary joint, lateral twisting will produce over-tension upon the lateral ligaments of the coronary joint, so that when your colt is four or five years of age, you will notice he has osalis or exos toe seats, bony outgrowths outside and inside the coronary joint, the result of a chronic inflamation of the periosteum or bone skin, and that has been caused by stretching the lateral ligaments where they are inserted in the bone so that overtension set up periostitis resulting in a bony outgrowth.

That is one of the bad results of this injury that a long foot always exercises upon the relatively soft ligaments of the joints of the growing colt, so that the man with a colt should observe from time to time, and if the hoofs seem too long, he should handle the colt enough so that he can pick the foot up and take an ordinary shoer's rasp and use the rasp, the rough side first and afterwards the smooth or file side; rasp the length of the wall down to practically its normal condition. He doesn't need to cut the sole; if the wall is not too long the sole will take care of itself. If it is too long, it is often associated with thrush, which is nothing more than a rotting of the frog, and as the frog rots, the quarters fall together and we have the beginning of the contraction of the quarter, and following, nearly all lesions of the foot, horns and quarter cracks and side growing and various other things that follow contraction, contraction being the result of lack of frog pressure, which is the result of the wall being too long so that the frog cannot touch it, so it all harks back to a wall that is too long.

A Member: Under what conditions does a hoof like that long one grow?

DR. ADAMS: I presume this horse was crippled and could not be used and was probably tied in the stall. This horse was never free to walk around on the pasture or the hoof would have shown more wear. I just gave this as an illustration of what ground pressure will do in shaping the foot. It tends to carry the toe upwards, so that here, for instance, is a colt's foot that has been shortened by the blacksmith, but shows already a contraction of one-quarter. Here are the two front feet; they have been too long but were cut down to the normal length. One has had some thrush and the hind quarters of both contracted; probably was too wide to start with. Here are two that are perfectly normal. During the second year, the same supervision has to exercised; the colt is getting older and heavier and the feet are gradually getting larger. During the third year, the colt is handled and frequently shod, but if the colt can go without shoes on the farm until he is ready to put on the market as a four or five year old, it will be better for his feet. I bought a pair of five year olds a year ago next June, half brothers—six years old I should say, and neither had had a shoe on, although they had been handled so they could be shod, and I assure you they have much better feet than if they had been shod earlier. Here are a pair of hoofs of a four year old that have never been shod, and looking at them, you might say they certainly are not normal in shape, but they are perfectly normal in shape; they are an elegant pair of hoofs of the too wide standing position. This animal stood with his toes wide apart, and that was the normal standing position with him and he has a pair of feet that exactly represent what that standing position should show.

And in this connection I want to mention—I want to go off of the beaten path a moment, and say that through the country and to a greater extent now through the city than formerly, the machine-made shoes are being used in place of the hand-made shoes. They are really cheaper; they are cheaper for the horse shoer, but not as durable. The hammering hardens the shoe, and a pair of well made hand shoes will last longer than machine-made shoes, but machine-made shoes unfortunately are uniform or symmetrical in shape and one branch is curved just like the other. Most of them are elliptical but of different sizes.

Through the country a draft horse of course has a foot like that (indicating) a round foot, whereas the trotting bred horses have a narrower foot. You send a draft horse to a shop to have a pair of shoes put on him and the shoer picks out the size that equals his foot in width and with very little fitting as a rule, if it is a busy shop. Those shoes are driven on, the elliptical shoe on the round foot, and the result is that the shoe is even at the toe and even back here in the widest part of the foot, or it is usually too narrow in the widest part of the foot. The result is that the shoe is nailed on and the wide part of the foot, the side wall, is dubbed off with a rasp down to the shoe, but behind you see how curved those quarters are behind the branches. Machine made shoes are too straight and the buttresses, the points where the wall turns forward to form the bar does not bear on the shoe at all or bears merely on the inner edge of the shoe, so that the heels glide downward or inward or are squeezed together and corns and contractions result.

Therefore if your horse shoer uses machine- shoes, insist that he heat them and go over them once or twice with a hammer to hammer them and shape the shoe to the shape of the hoof and then there will be no objection; but putting the cold shoe or the shoe without shaping on the ordinary hoof results in a very poor fit. It results in the wall being narrowed where it is too wide for the shoe and in the quarters receiving no support. Now here is a pair of feet of a horse that was not shod often enough. This horse came into the shop and his feet were pretty long. The shoer said he guessed he'd cut the shoes off first, so he took his saber and wooden mallet and started back here and simply cut off the shoes, hoof and all and then had a lot more horn to cut away before he had another pair of shoes on. He threw them in the scrap pile and I said, "I'll take those, they are a pretty good example of neglected shoeing;" so these two shoes were simply cut off the horses foot without drawing the nails at all.

How can the owner tell when his horse is properly balanced, that is when the outer and inner walls are of proper relative lengths? He can tell first by the wear of the old shoe. That is the best evidence we have of the manner in which the horse has set his foot to the ground during the period that he has worn that shoe. It is the record of ground contact, because the wear of the shoe occurs during the scouring or sliding of the hoof upon the ground. It is not the weight alone without motion that causes wear. The shoe will sustain a hundred thousand pounds if it is not moved at all, without wearing at all, but it is the sliding of the foot when the foot grounds and it is the sliding of the foot at the toe as the animal breaks over and gets away that causes the wear. If the shoe is wearing unifomly, no matter how thin, if one branch is equally thick with the other and the heel does not wear any faster than the toe, then we presume and we know that the foot must be set on the ground flat, so we say a horse is properly balanced when the foot comes to the ground flat, the inner wall and the outer wall strikes at the same time.

Here is an old shoe, it was a Fullard shoe, it's a right front shoe worn quite thin; all the fullering is worn out; that is the crease, just as thick on one side as the other, almost. That is a beautifully worn shoe, it shows that the horse has been setting his foot to the ground flat during the month. In dressing a foot down, take off as much on one side as the other. Here are a pair of horse shoes taken from a horse which had a rubber pad, and there is uneven wear. These two branches are much thicker than the other, the inner branches in other words are relatively thick and the outer are relatively thin. It means that the outer wall has been coming to the ground first and getting the first scouring, and that was because the wall was too long outside and held the shoe down too far. That is an indication, to be sure, after he has removed the pads and shoes and is about to level the foot, that he must take off more on the outside than on the inside, because it has been too long and held the shoe down, giving the outer branch the first scouring. If the shoer takes off the same amount inside and outside and puts on another shoe the branches of which are of equal thickness, the horse will begin to scour first on the outside. Here is a pair of shoes from which the owner got about all that was coming to him. It was originally a pair of shoes with toes and heels and when they were brought back, this is all there was to come off. The toes of the front feet had been worn away, heel corks, in fact the branches had been worn away. They were full shoes and yet the beauty about them is that they were worn as thin as scale and yet they are all there. That horse was traveling level, coming down flat, so the indication of a proper balance is the wear of the shoe. When front and hind shoes wear evenly, the foot is coming down flat, and where one branch wears much thinner or faster than the other, it is an evidence of one of two things; usually it is an evidence that the wall above the branch is too long and needs cutting down, or in case the horse is properly balanced so that his foot does come down flat, it is an evidence that the thinner branch is too far under the foot. A horse may be perfectly level, coming down perfectly flat, but if one branch is set out wide and the other under the foot, the branch nearer the bearing center of the foot is borne more heavily on as it slides along the ground, and wears faster. You take a bar of lead, we will say, a foot long, a bar of lead of equal thickness a foot long, and put a ten pound weight on one of the ends of the bar and a one pound weight on the other, and lay that bar and a one pound weight on the other, and lay that bar on a sandy surface and put your finger against the middle of it and push it along a hundred feet ,and you will find that the lead will wear faster under the ten pound weight than it will under the one pound weight. The bar has slid the same distance, both ends have slid the same distance, but one end has been under ten pounds of pressure and the other under one pound. It is the same way with the shoe, the shoe represents the bar; if one branch is near the center of the foot and the other far out from the center of the foot, the branch near the center bears more weight as it glides along than the other branch, and therefore must wear faster; so that, aside from keeping the feet of proper length and assuring an even wear of the shoes, there is very little that the farmer need pay attention to. Those are the two greatest injuries that can occur, the uneven wear of the shoe and the excessive length of the foot. I thank you.

The SECRETARY: I would like to inquire whether there is some remedy that can be reached by shoeing when one wall comes too near the center of the foot? What will you do in a case of that kind?

DR. ADAMS: Here is a pair of base wide feet. This colt stood naturally with his toes wide apart, and in that standing position there is always a tendency for the inner wall to be flat and to contract, in other words to come too near the center of the foot, and the question is, what can we do in the shoeing when one wall of the foot is too near the center to bring it out where it belongs? Well now, there are mechanical means of widening a foot that is too narrow. It is a general principle that, within certain limits, the wall always follows the shoe; in other words, if there is contraction of one quarter, I must set my shoe out full or wide at that point, because the tendency is for the shoe, if the hoof has something to glide upon out beyond itself it is coaxed out, but if you habitually set the shoe under, you will get a narrowing of the quarter, the horn will come in; so fitting shoes full coaxes the wall out within certain limits, and fitting the shoes narrow, coaxes the wall in.

Now, if there is contraction of one quarter or one side wall, that is if one quarter or side wall has its lower edge too near the center of the foot, we can also assure frog pressure, we can give the animal some form of frog pressure, either with the back of a bar shoe or with a rubber pad, and when the frog gets pressure, there will be a development of this fatty cushion of which the frog is a part, known as the planter cushion, and as the planter cushion develops, it drives the quarters apart and the posterior third of the foot becomes wide; in other words, we should see to it that the frog is functionating, that is that it gets pressure, that the planter cushion is fully developed. The mechanical means for driving the **quarters** out consist is using some form of spring, of which the best perhaps is what is known as the Chadwick spring, a V-shaped spring of round steel with a little brass ferrule to fit in the apex, which can be slipped backward and forward to weaken or strengthen the spring so it can be used for two or three successive shoeings. The points of the spring are set in full so they turn outward against the buttress. The hollow of the sole is filled with tar and oakum and covered with a rubber pad or leather sole and left on during that shoeing. A quarter of an inch or sometimes half an inch will be the expansion that will take place in the quarters during the period of one shoeing, four or five weeks, as the result of this mechanical use of the spring, but he won't need the spring if we do not allow the foot to become so badly mis-shapen.

With the first appearance of contraction, we should realize that the frog is not getting enough pressure, and see that the frog is left untouched, so that when the plain shoe is in place, the frog will extend downward an amount equal to the thickness of the shoes, and therefore will bear on the ground evenly, and that is a general principle to follow in the country. The frog ought always to be left prominent enough so that when a plane shoe is fitted to the foot, the frog will touch the ground when the foot is placed upon the ground. Horn should never be taken off the frog of a horse that is shod with the open shoe; it will expoliate, it will throw itself off in flakes when it becomes too long; it is only when we shoe the hoof with a rubber pad or bar shoe that we may have to cut the long frog down so as not to give too much frog pressure; so that fitting the shoes full at the contracted point and giving frog pressure or using some mechanical means such as the Chadwick spring are the measures indicated where there's a narrowing of the foot at any one point.

A Member: What do you do for a stumbling horse?

MR. BARNES: Are corns caused by the neglect of the horseshoer when he is the man that shod the horse? Is he responsible for the corns?

DR. ADAMS: Well, it is pretty hard to say that corns are always the result of the neglect of the horseshoer. We are misled when we think of corns on horses as of corns on our own feet, because a corn in a horses foot is not anything like a corn in the human foot. The corn in the human foot is nothing more than a thickening of the outer layer of the skin, the result of increased blood supply to that particular part, which is the result of friction or pressure on that part. Where the shoe works or bears on a certain part of the toe, the skin gets thicker and the pressure of the shoe presses that thickened part in and you have what we call a corn. A corn in a horse's foot is nothing more than the bruising of the tissue which secrets the horn, a bruising of the tissue, and that results in that tissue becoming somewhat thickened, it is true and every fresh bruising breaks some of the little capillary vessels and blood escapes and is imbibed or soaked up by the new horn, and when the new horn is pushed to the surface by newer horn underneath, we see the red staining which is an evidence of previous bruising. There isn't any thickening of the hoof over the corn, there is just a condition of local inflamation in the horn secreting structure down beneath the hoof.

There are great many causes of corn. Of course the flat soled horse is subject to corns. You must keep the pressure of the shoe away from his sole except along the margin. It is always permissible and it is proper to allow the margin of the sole to bear on the shoe. It always should, under all conditions, except when we apply two ounce or three ounce or four ounce running plates to horses; these bear just upon the wall and not upon the sole, but the sole should always be supported; an eighth to a quarter of an inch of the margin of the sole should always rest on the shoe; about an inch or so in from the white line or margin, the sole sinks a little bit, and if that portion strikes against the inner web or edge of the shoe, it will cause bruising; so in a flat soled horse we must be careful to widen and concave the shoe so that while it shall arch over the sole and protect it from bruising by stones, it shall not come in contact with it. Then, contracted heels, dried out, shrunk frogs, usually accompany bruising of the sole. The horse that has side bones often has corns on the same side, that is on the outer quarter. The shoer may not be responsible for the corns that accompany side bones, although, if he is careful and keeps the side that has the side bones down to its proper level so that the shoe will be worn uniformly, as a rule, there will be no corn upon that side.

A Member: Don't you think the average shoer burns the foot too much.

DR. ADAMS: No, I do not. There are two sorts of fitting, hot fitting and cold fitting. It takes a very fine mechanic to perfectly fit a shoe cold. Neither you nor I would be willing to pay him for the time spent in making a proper fit of a cold shoe. The horn is a poor conductor of heat, just as your hair is. You don't take a general anesthetic when you go to the barber shop and get your hair signed or have it cut, you haven't any feeling in it, and that's the way with a horse's hoof, he has no sensation or feeling in it, it is such a poor conductor of heat that you can take a dry sole a fourth of an inch thick and put a heavy shoe weighing a pound and a half at yellow heat upon it and it will be there four minutes before the temperature will raise on the inside, by tests. It is such a poor conductor of heat that it is practically no conductor at all. You can take the end of a horn and burn it clear up to your hand and won't feel any heat in it. Of course dry horn is a poorer conductor of heat than moist horn is. There is excessive use of the hot shoe, of course, but the only perfect rapid fitting is hot fitting. The shoer takes the shoe at a dull heat, having previously leveled the foot as well as he can with his eye and leveled the upper surface of the shoe, he drives the pritchel in the outside, to nail, places the toe in the center of the foot, bears down and takes the handle of his hammer and bears on the other branch to get an even bearing, and just as soon as it begins to smoke, he takes it off; then the high points that have been touched and have been scorched, he takes the smooth side of his hasp and lowers the high points that have been touched; then he puts the shoe on again and the scorched area covers more ground and the third time it scorches all the way around. That contact all the way around does not hurt the horse and he gets a perfect fit, so that proper hot fitting is the only true fitting.

A Member: Do you not consider it the worst practice for the smith to take his rasp, after the shoe is on, and rasp the foot to make it fit?

DR. ADAMS: Yes, sir. The outer layer, which we call the pariope, is represented in the watermelon by that dense glistening, hard layer on the outside. I remember a number of years ago Professor Barney told me, if you sand paper a melon and remove this cuticle, the melon rapidly loses moisture by evaporation and shrinks, and that exactly what takes place in the hoof when this pariople, whose function seems to be to prevent loss of moisture by evaporation, is removed by the rasp. It is only permissible to use the rasp on the horse's hoof as far as the clinches, not above, and when a horse comes from the shop with the rasp marks on the wall from the heel around to the other heel, clear up to the hair, it's enough to make the gods weep.

The CHAIRMAN: Doctor, we regret to announce to you that you have filled your time, and if any other member of the Institute has any question, let him write it and possibly we will have time to hand it over to the doctor later. Now ladies and gentlemen, we have, as the next number on this program, "The Agricultural Press and the Farmer," by Mr. Arthur J. Anderson, Editor of the Pennsylvania Farmer, Philadelphia.

Mr. Anderson's paper is as follows:

## THE AGRICULTURAL PRESS AND THE FARMER

By ARTHUR J. ANDERSON, *Philadelphia.*

Mr. Chairman, Ladies and Gentlemen: I wish to thank your honorable body for the opportunity to meet with you and present a few of the features of the relationship of the Agricultural Press to the farmer. The Agricultural Press is the pioneer in agricultural development work, and the farm papers have become so common and numerous these days, that I think we are sometimes in danger of overlooking the actual influence of the Agricultural Press in the development of agricultural knowledge and influencing actual farm operations. It may be interesting to note that there are at the presene time practically 450 agricultural papers published in this country. These agricultural papers include also the special papers, such as horticultural, poultry and bee publications and papers of that kind. But in spite of their numbers, they are probably among the leaders in influencing the actual operation on the farm. In order to save time, I have confined what I have to say on this subject to a paper:

*The Agricultural Press and the Farmer:* The agricultural press claims a position by the side of the Institute, the agricultural college, and the experiment station as a general educational factor. In fact the farm paper antedates them all. Before it was thought necessary to have special institutions of learning for the dissemination of agricultural knowledge, the farmers were drawing new ideas and new inspiration from the experience of their more enterprising fellow farmers, as told in their farm papers. Before experimental stations were established and before agriculture was recognized as a science, the farm papers were recording the results of practical experiments conducted by the most successful farmers of their fields, and formulating principles which have since been accepted as the basis of scientific truths. Our readers were getting the results of useful experiments, conducted under extremely practical conditions, and leading to successful farm practice, all recorded and occasionally illustrated in the pages of those early farm publications.

The farm papers were the forerunners of the farmers' institutes, and in many states the first institute speakers were men who had established their reputations for advanced thought and successful practice in farm management through their writings in the leading papers of the day. Even, I dare say, that many of you find a warmer welcome for your introduction to new audiences made easier when you have given your hearers the opportunity to say: "I have read your articles in such and such a farm paper." The colleges, experiment stations and the farmers' institutes are all the outgrowth of the agricultural development of the last sixty years. Farm papers have been more or less widely distributed in this country for the past one hundred years, and I believe that I can safely claim that they have held their popularity and maintained their usefulness fairly well during all of this time. Now we are to have the country demonstrators, the farm bureaus, agricultural highschools, and agricultural instruction in the rural schools. All of these are to take the field in the development and dissemination of agricultural instruction which the farm papers once held alone. One might well suppose that with these all fully established, there would be no further need for the agricultural press, but these papers have been one of the most potent factors in paving the way for these newer agencies, and they will continue to share the field with them in the future.

Just as the farm papers have made more and better agricultural students and larger and better institute audiences in the past by awakening interest and creating a demand for more and better agricultural instruction, so will these schools and demonstrations, as well as the colleges and institutes make more appreciative and discriminating farm readers. Any institution which works honestly and efficiently for the improvement of farm conditions will share in the demand and appreciation of such institutions. The primary aim of all of these agencies has been to assist the farmers in the general business of farming and in the development of the great industry of agriculture. A fair measure of success of each in attaining this end may be determined by the extent to which each has succeeded in actually reaching the man on the farm and influencing his farm practices; also by the value placed by farmers themselves upon these various agencies in improving their condition and assisting them in their work. I said that the farm paper has retained its popularity and maintained its usefulness fairly well in comparison with other established educational institutions. This claim is substantiated, though not necessarily proved, by the findings in an investigation recently conducted by the United States Department of Agriculture. You are no doubt all more or less familiar with the results of this investigation, if not with the actual figures. I present them merely because of their direct bearing upon the question at hand.

In order to secure definite information upon the effect of the work of the various agencies in influencing farm practice in this country, the Federal Department of Agriculture had a house to house survey made in four sections of the country, covering the East, the South, the Central North, and the Middle West. The route of the agent conducting the investigation in the East extended from the northern part of the State of New York, reached southward across Eastern Pennsylvania, touching New Jersey and Delaware, and extending across Maryland. In all, 3,698 farmers were interviewed. Each agent was supplied with a set of questions, the nature of which is indicated by the following of conclusions. Of the total number of farmers interviewed, about one in every 1.5 was found to take a farm paper; one in 2.3 receives agricultural bulletins; one in 3.3 attends farmers' institutes; one in 6.5 belongs to some agricultural organization; one in 14.5 writes to agricultural institutions for advice, and in the South one in 11 gets personal instruction from county demonstration agents. Of the farmers who received agricultural bulletins, attended farmers' institutes and took farm papers, 21 per cent. favored the bulletins as the most helpful sources of information on farming; 14 per cent. favored the farmers' institute, while 66 per cent. favored the farm papers. Even in the case of the small number interviewed in the South where the county agent system has been installed, only 11 per cent. favored the bulletins and 24 per cent. favored the farm papers. So far as this investigation can be taken to indicate actual average conditions, the farm papers still lead in reaching and influencing the actual farmers.

As students of farm conditions and being interested in all the agencies operating in the interests of rural development, the results of this investigation seem to merit some analysis. I do not believe that the indicated popularity of the farm papers over other educational factors necessarily reflects or is due to superior qualities in the papers themselves. The papers merely give their readers the latest and most advanced information on general farm subjects. Much of this is developed by these other agencies, and put into practice and adopted by practical farmers. The preference indicated must therefore be due more to the manner in which the papers present their matter and upon the measure of confidence which the papers inspire in their readers, than to what they present. A brief analysis of the methods of farm papers may therefore be interesting as suggesting some fundamental principles which may well be kept in mind these days when so many efforts are being made to educate, assist and otherwise stimulate the farmers and the rural communities.

One of the first essential features of the farm paper is the fact that the farmer must pay a price for its service. The price is small these days, and it is sometimes made with a combination of premium offers which make the actual investment ridiculously small; but nevertheless it represents an investment, and having paid his money, the farmer feels that he has a legitimate claim upon the services of his paper, and he uses it. The Government and State bulletins, as well as the institutes and, in some cases, the county agent, lose some of their value in the eyes of the recipient because they represent no direct outlay of money or effort to secure them. The bulletin, for instance, which comes unsolicited and unsought, lacks the personal appeal which insures appreciation.

I believe there is a positive danger in the new county agent movement in this same connection. No one can reasonably doubt the possibility for good in the movement if it is rightly conducted, but to fill the field and accomplish results, the call for the demonstrator must come from the farmer and not from his city friends, the State or the Federal Government. When the farmers are sufficiently interested in the need of a county demonstrator to request his appointment, and when they will dig down in their pockets for the money to employ him and maintain his office, they will use his services and demand a commensurate return for their money. Under such conditions the farm demonstrator system will succeed.

Another feature of the farm paper which makes its appeal to the practical farmer is its timeliness. It comes to hand when most needed. A handicap which you institute men must meet each year is the fact that your talks with farmers are so removed from the season of actual application of your suggestions. You may do your very best, but at the most you can only send your audiences home with renewed inspiration and a few fundamental principles which your most attentive listeners are able to retain. You have done your duty, but you have no assurance that your hearers will retain your suggestions until the time when they can put them into practice. Here the farm paper has an advantage over you. It is on the job the year around, and can plan its most valuable features to appear just in advance of the time when they are most needed in practical work. You may have given exactly the same information in your institute talks the preceding season, but by the time the farmer is ready to make use of the information your talk will have been forgotten, and his farm paper gets the credit. Let me drop this suggestion: If you have a real message pertaining to special farm practice and you really want to get it to your fellow farmers in a way and at a time that it will soak in to stick, preach it first in your institute talk, but give it later, when it is most timely, to the agricultural paper which your fellow farmers are reading.

A third feature which I think is fairly well represented in the general farm papers today, but which may be further applied by the press, the institute and the bulletin, is the practical presentation of a subject. In the farm survey to which I have referred, of the 3,698 farmers interviewed, 1,616 or 43.7 per cent. said that they believed that practical experience is the safest guide to farm practice. There is a big lesson in that demand for the practical. The farmer may listen to theory and admire argument, but there is no class in business today that will apply the acid test of practice more rigidly or keenly than those who earn their living from the stubborn and mysterious soil. We may talk of the rapid advance of the farmer in grasping the vast amount of scientific knowledge now being hurled at him. He is making rapid progress, and his opinions as well as his understanding of "book farm" information is rapidly improving, but nevertheles a very large amount of the matter now being directed to his attention is figuratively "shooting over his head."

Experiment station literature praticularly, must, of necessity, deal with scientific facts in language not readily understood by farm readers, but the most useful are those which get away from technical and involved phraseology as much as possible. Many a station bulletin defeats the purpose of its publication because it confuses truth in the minds of its readers rather than elucidating it. Let a farmer tell the story of an experiment station problem in his own words, and in the words of his readers, and he will make more converts and create a more lasting impression, and therefore a more valuable one, than could be obtained by a half dozen readings of that same bulletin. The station literature gains in poularity and usefulness in being retold in the language of the agricultural newspaper writer, and in application to actual conditions on the farm.

This fact is very nicely illustrated in the case of at least one station authority of my acquaintance who conducts a regular department for a leading farm paper. He handles a large number and a wide range of questions in general farm practice from the readers of the paper. In making his replies, he supplements his practical experience with facts which have been developed by various experiment stations which have conducted tests on the questions at hand. His replies carry much of the same information which is available to the farm readers in published bulletins, if they would but use it. The bulletins remain unread, yet when told by this man in the language of the farm reader, and when applied to specific cases, the information is not only accepted at its full value, but it is put into use in the actual operations of the farm. And here is an added fact which points its own lesson: This man's service is immensely popular with the farm readers, and the station authorities have observed that this service has increased the popularity of the station and increased the demand for direct station counsel with the farmers of the State.

In making this analysis of what I consider the favorable features of the agricultural press, and in attempting to point out some of its practices which might be used by other agencies, I do not want to be understood as maintaining that the farm press is not without faults, or that it is all that it should be in present or past make-up.

There have been great improvements in the general quality of our leading farm papers in the past twenty years, and perhaps they have shown as great progress as other agricultural institutions. But there must be even greater improvements in the future. Past methods and the concentration of effort on a few lines will not suffice under the conditions which we may reasonably expect to prevail in the future as a result of present interest in agricultural educational work. The agricultural papers of the past have not shown the qualities of persistent active leadership which their readers have the right to demand of them. Too many have been satisfied to simply keep abreast of their time, reflecting advances in the agricultural industry as they have been developed, instead of being actual leaders in that progress and pointing the way to new accomplishments. They have attempted to hold popularity by too much of a follow-up policy instead of earning popularity and establishing real worth by actual accomplishment.

The value of the public press as a champion of a worthy cause has been proven time and again. We can all point to certain daily newspapers that have won places among the great national powers in shaping and influencing national policies and in leading in the accomplishment of worthy causes. Some of our present day dailies are making their influence felt in the same way. In the great special problems facing the agricultural industry of today, and in presenting the just claims of agriculture as related or opposed to other great national interests, there is need of just such leadership in the farm press. Perhaps it is too much to ask that a single farm paper, with a restricted or localized circulation, shall ever make such leadership effective over a large area, but the combined influence of all of the leading papers in the interests of a common cause would give the industry the representation which it must have in the future. Let us suppose that all of the farm papers of this country had combined in an effective fight against the Canadian reciprocity pact which was enacted in Congress two years ago. Suppose that each paper by persistent presentation of the actual provisions and application of that measure influenced one-third of its subscribers to direct a personal protest to their political representatives against it. The result would have been one of the greatest industrial demonstrations ever made in this country, and would have established the relative importance of agriculture in the country's interests as nothing else would. It would have insured the consideration from Congress for a period of years which the industry deserves. It is leadership of this character which the farm readers have a right to expect from their farm papers, and which they will demand some day in the future.

We are learning to realize that agriculture is more than a profession; more than the mere production of crops. It is a life, the most vital of all industries, a great teeming, living world with special interests in the field of state and national legislation and with special problems as broad and as varied as human life itself. As representatives of such a life, and as champions of the farmers' cause, the farm papers of the future must branch out in individual effort and show more unity of purpose in their consideration of these interests.

We are all familiar with the oft-repeated assertion that agriculture is the greatest wealth producing industry in this country; the keystone of National prosperity. Yet in practically every instance in which agriculture clashes with the other great National industrial, agriculture is sacrified by the very men who eulogize the farmer, and advantage is given to the other interests. In questions of taxation, special legislation, industrial privilege and the ever-troublesome tariff rates, and rights and welfare of practically every other industry are considered first and agriculture takes what is left and is expected to adjust itself to the new conditions as best it can. There is a logical and very practical reason for this. The agricultural industry lacks the concentration and organization that is enjoyed by the other industries and is unable to bring concerted action to bear to present its just claims and grievances. Through lack of leadership and organization the farmers have never been able to present the full power of their combined numbers. The day of organization is promised, but in the meantime the farm papers can do much to concentrate public opinion and direct organized effort in securing the desired results.

One of the first requisites to every successful paper, whether it circulates in the city or on the farms, is that it [redacted] confidence of its readers. This presupposes a number of very important conditions, and it is going to require more in the future than it has in the past. The farmer of the future will be more the reading farmer, and reading more, he is going to be more discriminating and exacting in his selection of papers and in what his papers give him. To command the confidence of such readers, the papers must build up a reputation as authorities upon the matter which they handle. This means that the reading column must be under the supervision and censorship of men who are equipped with practical experience as well as scientific training to be able to discriminate between the safe and the unsafe, the truth and the untruth. The material must be drawn more and more from the acknowledged leaders in farm practice, and those who have demonstrated the value of their counsel by success in actual accomplishment. The most useful farm papers today are those which are drawing their matter most largely from the leading farmers of their own field, and are keeping in close touch with the actual needs of their readers. In the future, there will be even less matter written in the office, and more from close contact with the actual work of the farm.

Another requirement of the successful farm paper in the future will be the enlargement of its field. The papers of the past have specialized almost exclusively in matters pertaining to the production of crops. Along with other similar institutions they have assumed that crop production is the chief aim of farming. Following this assumption they have discussed production methods with every known farm crop year after year with little change in fundamental principles but depending merely upon a new setting to give spice and variety. The first issue of one paper with which I am familiar, published in 1848, contains a number of articles on crop production which in general features are no different from articles appearing in dozens of farm papers today. The useful farm paper must continue to discuss production methods, but it must also find space for other and equally important farm interests.

We are at present face to face with the greatest economic question of better marketing. We have learned and are continuing to learn how to make two blades of grass grow where but one grew before, but we have yet to learn how to make the two blades yield double the return in worldly goods or comforts of life that the one did before. We are just starting to investigate the principles and availability of cooperation and the possibilites of self-help through mutual help. The country is awakening to the fact that in our present wasteful system of marketing we have one of the greatest economic wastes of the age. It's unreasonable to suppose that this condition will be permitted to continue. A remedy will be found. If it is not developed by the producers, it will be by the consumers of their representatives. If developed by the cities, the remedial measures will all be shaped to suit the cities' needs. If remedied by the producers, they may hope to receive some of the benefits and advantages of such a reform. This question will be of vital interest to farmers in the next few years, and the farm papers must give it ever increasing attention.

With united effort in the solution of these problems must come organization and a closer combination of farmers. The community is the logical unit of successful cooperation, and there must be increased interest in those things which go to make up better community and better home environment. Under the conditions prevailing in rural life, the rural home must ever be dependent to a large degree upon the spirit and tone of its community. The social, school and church conditions, which make a community a better place to live in, make it also a better place to invest money in and a better place to farm in. The improvement of these conditions are economic as well as social problems which are vital to rural prosperity and happiness, and they must eventually find an important place in the attention of all farm papers. Farm papers are now going into practically three-fourths of all the farm homes of this country. In many of these homes they are practically the only current publication taken. If they even approach the limit of their usefulness, they must be faithful representatives of the best interests of these homes.

There are a number of minor improvements which will eventually come as a result of a better understanding of farm readers and greater attention to details. For instance, the style and quality of workmanship will improve. For years little attention was given to the quality of paper, perfection of presswork, and selection and clearness of illustrations which all go to make up the appearance of a publication. The publishers assumed that the farmer placed no value upon these features. This assumption is rapidly being displaced, and we may soon see the farm papers comparing favorably with other technical journals in the style and quality of their appearance as well as in general wormanship.

Another feature is the class of advertising matter handled. There has been a great change in this respect in the last few years, and publishers today are refusing space to advertisers who were never questioned a few years ago. They recognize that they owe an important duty to their readers in keeping their advertising columns free from matter which would deceive, defraud or injure their patrons in any way. I believe that this practice is general with all farm papers at the present time. No reputable paper could afford to accept advertising which would make dissatisfied readers, and I am sure that the advertising columns of the agricultural press are as free from such matter as those of most other classes of publications. If a fraudulent advertisement creeps in, you may be sure that the publisher has been deceived, and he will be the first to remedy the error. But there are still some things to be desired in this respect. Publishers are even now going beyond the mere question of honest dealing, and are satisfying themselves as to the actual value of the advertised goods, the specific claims of the copy, the fitness of the articles offered and the effect of the presentation of certain classes of advertising upon the members of the reader's family. The future will find cleaner advertising columns and even a higher standard of advertising merit.

In making this brief summary of the present and future of farm papers, I must confess to a more or less biased viewpoint. We are told that when we think too long on one side of a subject we are in danger of falling into a rut and becoming cross-eyed in our view. If we have conceived a cross-eyed vision of the future of the agricultural press, it is due to an over-confidence in the accomplishment of the ideal. I believe that most of the farm papers today are making a serious and conscientious effort to reach this ideal, and spurred on by the increasing demands, they will branch out and develop as efficient leaders in the great industry which they represent. You and I know that it is the greatest industry in the world today, and it will continue to be so for many years to come. If I am expecting too much of the future development of the industry, I am merely indulging in the general optimism so characteristic of farmers everywhere.

I like the sentiment of the posters which were displayed in many of the rural communities of Ohio, following the recent flood. It expresses the real spirit of the farmer as he meets the uncertainties of Nature and her various moods. The people who could express such sentiments after such a visitation of flood and disaster must inspire the confidence of the leaders in agricultural work, whether they be institute men, college or station workers, or directors of the agricultural press. The posters read:

"We've had our time of flood and gloom,
  We've neared the awful gates of doom
    And some have entered in.
But now the sun of hope peers out,
  Old troubles we can put to rout;
    So grin, gosh dern it, grin!"

The CHAIRMAN: Ladies and Gentlemen: You are differently constituted from what I am if you don't get very tired in three hours sitting and listening to entertainment as is usually the case in these normal meetings, and I am going to make a suggestion to you. I will hold the watch on you, if you will stand up for two minutes to rest yourselves a little while those doors be kept open to let in the fresh air.

(Short recess.)

The CHAIRMAN: I have the pleasure of introducing to you, Mr. H. M. Collingwood, Editor of the Rural New Yorker, who will deliver an address on the "Citizenship of the Farm."

Mr. Collingwood's address is as follows:

## THE CITIZENSHIP OF THE FARM

By H. W. COLLINGWOOD, *New York City.*

Mr. Chairman and Friends: I am no orator, and you will find it out before I go very far. I don't pretend to be a scientific man, and that will be evident also; and I know a lot of men who are neither one nor the other, but they lack the ability to realize it. Now, I think I do. I am going to talk in a plain, off-hand way to you, good friends, and tell you the things that I believe, that my life and my experience make me believe, for I have learned that it is better for a man to come straight to the front and say the things that he believes are true and stand by them.

I was brought up on Cape Cod, by a man who was called pretty close by his neighbors, and when you get a Cape Cod neighborhood to call a man close, you can make up your mind that he is close. That's right. I remember how, when I was twelve or thirteen years old, whenever I took a ride on the railroad train and the conductor came in the car, that man would pat me on the shoulder and say, "Scrouge down, make yourself just as small as you can, so he will think you are under age and I won't have to pay your fare;" and I confess that I did it, and I passed for a number of years, as a very small boy. I never liked to do it, but I did it. Years afterwards, I went to a public hearing where a great railroad corporation came and demanded the right to put an increase on their passenger fare, and a great lawyer got up and made his argument: "Gentlemen, we have got to have a big margin on this thing, because these farmers try to cheat us." And do you know he went on and told that very case of a boy that scrouged down and cheated them out of half fare; and I kept my seat and couldn't get up and say one word in reply, although I know they had no right to the increase in their railroad fare, but it took the whole heart out of my argument to know that what that man said was true. Now, I am going to talk plainly; I am going to say just what I believe and I am going to say it, I hope, so that you will know what I have been talking about.

In the first place, my friends, it might be asked, Why there should be a special citizenship for the farmer. I find that whenever a farmer makes a demand for what he believes to be fairly his rights in business or in politics, he is generally met with the statement that he has no right to expect anything more than other people receive. The farmer does not ask anything more than others deserve, but he has the right to ask a square deal in business and society. It frequently happens that he cannot obtain this square deal except through particular and peculiar ways of getting hold of it. A little thought would show why this is so. The farmer lives a life different from that of any other citizen. His home and his farm is a little community by itself. A man working in a town factory, or a man running a store, is a small part of a big machine, a cog in a large wheel. It follows therefore that law and social habits which take care of this big wheel, usually take care fairly well of the little cog. A farmer on the other hand, instead of being a cog in a big machine, runs a little machine of his own. It may be a small machine, but it is pretty much the whole thing as a machine, all the way from the motive power down to the little cog; being located right on the man's farm. People do not always get this distinction between the two. The town man is a little part of a big piece of machinery; the country man is the entire proposition of a small, complete machine.

Not only is that true, but in his relations to society, the farmer is on a different basis from the man who lives in the town. The town man is a consumer and handler. He rarely, if ever, gets his hands down to the real foundation of things. He takes the things which have originally come out of the ground; makes them over into different forms, and sells them in the market. To put it another way, the farmer feeds the world, while the man who lives in town waits upon the world, runs its errands, and serves it in various ways. We want to get this thing firmly in our minds, that the man in town runs upon the errands of society, while the man upon the farm is an independent producer, not merely running upon the world's errands, but providing those essential things without which society could not endure for a year. The men who do the work in our towns and cities might go on a universal strike. That would not mean death to the Republic, although it might be inconvenient, for so long as food and fibre were produced out of the soil, men would find some way to get hold of them and fix them so that they could eat them or wear them. That has been so through all the history of the world; so long as the essential things of life were produced, men have found the way to distribute them. But let the farmers of the country or of the world go on a universal strike in like manner and refuse to produce an ounce of food or fibre beyond what is needed in their own families, and we would have a very different situation.

Then there is another thing. In all the history of the world it has been a part of accepted belief that the farm or the country is the foundation of the health and the vital force of the Nation. This has always been so from earliest times. Just so long as the farmers of a Nation were happy and prosperous, and able to provide what they felt was needed in their home, the Nation itself has been strong and contented. The cities are recruited in each generation from the farm. If there were no farm boys and girls to bring fresh vigor and health and strong rich blood into these towns and cities, the civilization of the city would die out in three generations.

I could give you a hundred instances from history to show how this has always worked out in the same way. You may take one, the history of Rome. For many years Rome ruled the world. That was when the city was comparatively small, and when it was dominated by the farmers and small free holders of Italy. So long as these men controlled public affairs, Rome was safe from invaders. There came a time finally when habit and custom of the city changed, and the Romans reached out to conquer the world. There was a curious thing about the way they did it, for the Roman conquest meant simply the building up of large cities. In all the history of that time it cannot be found that the Romans ever extended Agriculture or farming. They had no use whatever for a farm except that it might produce soldiers for the Roman army, and food for the cities, the farmer himself being regarded as an inferior man. This became the national policy, and it was only a question of a few generations before the entire character of the Roman people was changed. Slaves and hirelings did the fighting. The soldiers had no patriotic or home feeling, but they were willing to fight for the tyrant who would pay them most. There came a time when the true Roman soldier got so lazy that he wouldn't even carry his weapons. He would fight with them, but he hired a slave to carry them on the march and take care of them. The slave began to practice with the weapons, and with the strength that he gained by carrying them about from place to place, he was able in time to defeat or kill his own master, and became the soldier in turn.

That has been the history of every nation where the small freeholder of land, or the farmer has been neglected, or has not received his fair share. A century or two ago the English army was largely made up of stout young farmers from the country, and a certain standard of size was adopted. Then came the land policy of England which made it difficult for the small farmer, or what we know as the hired man, to obtain land of his own, and there came a rush of able bodied men to the town and the city, and across the ocean to America and Australia. At the time of the war with the African Boers, I am told that in order to fill the ranks of the English army it was necessary to reduce the requirement of size by one inch in height, as it was impossible to find the larger men formerly taken as soldiers. In other words the English farms were not breeding and producing the men which were produced a century ago under a fairer share for agriculture. I think that one chief reason why the English land laws are being changed so that it is possible for these smaller farmers to buy farms, is because the statesmen see the absolute necessity of making their farmers realize that they are to have a fair show with other industries.

And there is another thing: You cannot, to save your life, mention a great reform or a great moral awakening, which has not started and developed from the country. You may take the slavery question, or any other great moral development in this country, and trace it back to its beginning, and you will not find one which was originated and carried on exclusively in the civilization of the town. They have all been started and developed amid the silence of the hills by farm-bred men. They have not started in palaces or in great factories, but in lonely farm houses, or in barns where men and women not only had time for thought and for reading, but were close to Nature, undisturbed by small attractions and capable of realizing the meaning of large issues.

Take it therefore from any point of view you please. The production of wealth, the keeping up of the Nation's health, or the moral power which stands at the basis of it all, and the farm home stands at the foundation of the whole proposition. You may tell me that there are some farm homes wherein none of these things are to be found. For the sake of argument, I would grant that may be true as an individual, but as a general proposition, putting society into classes as we find it, it cannot be disputed that the farm and the farmer who lives upon it stand as a foundation of those things which we most desire in the future of this country for the comfort and the hope of our children.

These things being so, we are justified in speaking of a special citizenship for the farm. First of all, our farmers must realize that during the last 50 years we have had a tremendous development in all lines of industry. Much of this development has directly affected the city and the town, yet it has indirectly affected the farm as well. If 50 years ago I had gone to the old gentleman who brought me up on Cape Cod, and told him that I should see men flying about in flying machines, that I should see gasoline engines coughing their way along the road, or doing the work of the farm, or if I had told him the possibilities of the telephone, I am very sure that he would have taken me out behind the barn with a stick, that he might drive out the evil spirit. Yet these things are here, and looking back over half a century we hardly know or when they came. Having seen this development, we cannot expect to be justified in telling our children that all development has stopped. The truth is that 50 years from now those who follow us will look back upon this period in which we live, with a feeling of wonder that people could really have enjoyed life under such crude conditions as we find today. I could name a dozen things which I am confident now seem absolutely impossible, but which our children and our grandchildren will accept as matter of fact, just exactly as we now accept the telephone, or the automobile. This being so, the farmer should recognize the fact that he cannot hope to influence the world. and his country with any narrow or bigoted citizenship.

Yet there are several essential things which must never be given up, and which I believe can only be kept purely alive in the country. In the first place, the farmers must learn to co-operate. We have to learn how to come together with other farmers and other producers, organize our forces and get away from the selfishness of individual interest. This one inability to drop prejudice and pick up the principles of co-operation has, I believe, done more to hold us back as farmers, and deny us all our fair share of what belongs to us, than any other single thing that you can mention. The trust and the big combination in the town and city have learned the value of organization, and the men who work for them in the city and town not only feel the influence of this strong organization, but they have learned how to organize themselves into companies, and armies, so that they are able to protect their rights. If you will think for a moment, whenever your butter, your potatoes, your beef, your wool, or whatever else you may produce, leaves your hands, it immediately, through all its courses, passes into the hand of an organization or trust, of some kind. The railroads are organized, the express companies likewise, the truck men who take your produce away from the railroad, the commission men who handle it, the wholesalers who take it from the commission men ,and the retailers who handle it from the wholesalers, all are organized. You are the only one all down the long line who is trying to put the force of your feeble individual hands against this organized body of men. And so therein lies the great fundamental principle of true civilization for the farm, for if you analyze true co-operation, and get down into the principles of real organization, you will find what there is of business, patriotic feeling, and of real religion in the outcome of your life.

We shall be forced in this country to have an overhauling of both business and patriotic feeling. It ought to be evident to any farmer by this time that just so long as he tries to imitate the meanness, the dishonesty, and the grafting methods of the big interests in town and city, he will be placed more and more at a disadvantage, because those men are better able and better qualified to handle the game of graft, and to get more than their share by tricky means. The evils which afflict our country will continue to exist just so long as the farmers of this land try to imitate this meanness and graft of the people who have robbed them so long.

I have said that every nation naturally looks to the farm home for its moral strength and its physical strength as well. In like manner, have you ever stopped to think that the nation must look for its business and political reform in the same way, to the influence of the country people? I have said this thing to farmers before now, and had them reply that they are obliged to fight the devil with fire and carry on the methods of business which they know are hurting them in the city. It seems to me that this is a most foolish and short sighted policy, for I can tell you that the great majority of men who are doing business in this country would like to be straight and clean and will gladly follow any business reform that is based squarely upon the principles of the Golden Rule. And I would go so far as to say that this reform can only come out of the country, as every other reform has done.

The first element of any citizenship of the farm therefore is one of straight, square, honest business dealing in every way. I hope to see the time when it will be recognized as the meanest kind of sin to put rotten and wormy apples in the middle of a box or barrel, or to stuff any package offered for sale with inferior goods. I talk in this plain way so that we may clearly understand whatI mean. As a boy I was brought up in a Yankee town, where it was thought to be smart to cheat your neighbor. I know of a man who went to the village store one Saturday and raised a great outcry. He pulled a stone weighing about two pounds out of his pocket, and was ready to take oath that he found it in the middle of a bag of coffee which he bought the week before. The storekeeper looked at it and said, "That's right, I found that stone in the middle of the last tub of butter you brought in here." As a child it seemed to me remarkable that those men could not see anything but the smartness of such practice, and could not realize the sin of it.

As a foundation for my citizenship for the farm, I would teach our boys and girls, and our grown up people as well, that the first principle of honorable business dealing with our neighbors or with the public, is to regard the man who will wilfully cheat another in the sale of his products as a fit companion for the saloon keeper. You may say this is hard language, and that there is no one here who needs any such reminder. If the latter saying is true, I rejoice to hear it, and am glad to know that you have such a remarkable community. But seriously, this business reform which our country needs must, in my judgment, start from the farm, and it must start with the individual, the man, the woman, the child, who at the last analysis, is the unit to start the Nation's business away from the land. Here is a reform which we, my friends, you and me, individual farmers, may start and carry out.

Another corner-stone of our citizenship should be true patriotism. I do not mean the patriotism of the dollar, but I mean that kind of patriotism which, some fifty years ago, came to our parents as a real test of duty. We need a revival of Americanism in this country, and have got to have more of the spirit of those people who left their homes in the old country or in the older sections of this land, broke away from old associations and made their way into the wilderness that they might have a home, for the home feeling is at the bottom of any worthy brand of patriotism. I wonder if you people have read that story of the Octopus, the story of a railroad robbing the people? There is a character there of a German called Bismarck who came there from Germany to make his home, and Bismarck, in his broken dialect, said, "Gentlemans, this country no good; I go me back my fadder land, I no stay me here; I go by the fadder land." Says the man, "What is the fatherland, Bismarck?" "O, the fadder land? O well you are marching along in Germany, your gun by your shoulder and you hear the band play the march mit the Rhine and the flag goes up on the mast like that and you feel in your heart, 'I wish I could run and fight with the enemy.' That is the fadder land." Well, time went by and Bismarck met an American girl. He married, built a little home of his own, and strange as it may seem, he came up to the land office to take out his papers as an American citizen, and a joker punched him in the ribs like that and said, "Bismarck, what about the fatherland now?" The man looked at him as though for the first time he realized what he was doing. He looked at the people around him in his slow German way, and held up his hand and said, "The fadder land? The fadder land? You ask me where is the fadder land? I tell you. Where my home is, where I may work mit my hands to earn the bread for my wife and for my little ones, where I build the roof that shelters them, there is the fadder land."

I tell you, my friends, that that poor ignorant German had in his heart the true philosphy of living; that's all there is to it. Where my home is, there is the fatherland, and when we can get our farmers in Pennsylvania and in this country to have that same thing in their hearts, that home, home, home and what it stands for is there, all there is to it, then we shall have our citizenship of the farm which will be worth all the dollars and all the power and all the business which has been piled up in your cities and in your towns.

Some of you who are rich and think you are great may tell me that the future of Pennsylvania lies in the vaults of Pittsburg, lies in the great banks in Philadelphia, lies in the power of your State House at Harrisburg. You are wrong. You are so foolishly wrong that I wonder at you to make such a statement. The future of Pennsylvania lies in the hands of the little children who are playing on your streets today and playing on your farms at home. The future of this State lies in their hands and in the mental pictures which they are drawing of father and mother as man and woman. Some of us grow foxy and perhaps do not feel the necessity for labor that we did in other years, and the home does not seem to us what it did when life was younger and when it was necessary to toil through the long and weary day for shelter and for food. Prosperity ruins far more people than adversity ever did, and there is danger in the vast accumulation of wealth in this land that we shall grow away from the simple and homely things which are the real foundation of patriotism and national strength.

We owe a duty to our children, but they owe their duty to us as well, and in the country of all places the child should be brought up to honor his father and mother, and to reverence his home, and, of course, it follows as natural logic that if the child is to honor father and mother, father and mother themselves must be worthy of the honor, and they will be worthy and they will make their worth known if they will grasp these simple primary truth of life, for the best and highest patriotism is that which gives its generous sacrifice in worthy service. For let me tell you my friends that the great evils which have grown upon this country, and which we all recognize and deplore, will remain and grow worse until we buy them, and thus acquire the right to kill them off. We must buy them, buy them with our own labor, buy them through our own sacrifice, buy them by doing things which may be unpleasant, which may be hard, but which represent our little part of a great big penalty which the Nation must pay in order to be rid of the evil. We must buy these things and pay for them out of our own comfort, or out of our own prejudice before we can acquire the right to kill them off.

And the final corner-stone of the farmer's citizenship, as I view it, is a broader and more charitable view of life. We have lived in the past too much to ourselves. Many of us have fallen into the way of thinking, that when a man falls behind in the race it should be a case of the devil take the hindmost. You and I know how, under the modern system of rush and power, we scramble over men's shoulders and crowd them back in order that we may win the highest place. I think we are coming to the period when we shall recognize the futility of working in this way. We shall see how our little bit of success gained through the sorrow or loss of some one else is an ill gotten gain, putting us further down the scale of morality as we have climbed a little higher up the scale of prosperity. This works out all through society; we find it in our farm education as elsewhere. Those of us who have been granted the privilege of a little look into knowledge, and a little help at scientific thought, know how impatient we become with the faltering and the slow, or with those who are held back by prejudice or long years of slow inheritance. A college boy may go out to teach a district school. He is ambitious to keep up with his class. Let us say that he has one student who wants take Geometry and French, while he has a dozen little ones who do not know how to read. It as a fearful temptation for the young man to spend most of his time with the student in Geometry, and to ignore those stupid little fellows who cannot tell *a* from *b*, and yet it is his duty as a teacher and as a man, to help those little fellows out of the store of knowledge which society has given him.

In our agricultural education, which I believe to be the corner stone of farm citizenship, we are in danger of following the mistake of that school teacher; it is natural that we should want to associate in thought and in speech with the quick and the bright, with the strong and resolute, and to let those of slower mind or prejudiced views seek their own course. But the problems of the farmer are not worked out in that way. We cannot afford class education any more than class legislation, but those of us who pretend to be teachers, and to whom the state has given strength of thought and education, must feel that the slow and the prejudiced after all demand our best work and our kindliest sympathy.

DIRECTOR MARTIN: I just have a word to say before Mr. Zinn begins his address. We have been invited by the local management, Board of Trade and other good friends of the town of Washington to take a trip with them in the country and out to the fair grounds. We had promised to be ready by four o'clock, but we will say to Mr. Zinn that he may continue his address until fifteen minutes after four; that will allow three-quarters of an hour. Now I would like to know how many in this audience will be ready to take that trip at fifteen minutes after four? The cars will stand just in front of the court house. Those who will go, please hold up their hands. (Those present held up their hands.) Well, that's about two carloads.

The CHAIRMAN: Members of the Institute, I feel that you are not weary, and I take pleasure in introducing to you Mr. W. D. Zinn, of Phillippi, W. Va., who will deliver an address on "Factors Controlling Soil Fertility."

Mr. Zinn's address is as follows:

## FACTORS CONTROLLING SOIL FERTILITY

By W. D. ZINN, *Phillippi, W. Va.*

I confess that when I received the invitation from Director Martin to come down and address you, I felt myself highly complimented. The truth is, my friends, that I have been sitting at your feet for thirty years learning agriculture, and I feel that it is a case of the student instructing the teacher when I come here to discuss this subject before you.

The quesion of soil fertility, like the story of the Cross, is a very old one, and like it, the more we study it, the more interested we become in it. If you will pardon me my friends, for a personal reference, I would like to tell you how I became interested in soil fertility. About thirty years ago I had become the sole heir of a large farm of twenty-one acres of the poorest land that ever laid out of doors, I think. Realizing, as a good many farmers do, that I could do nothing on twenty-one acres of land, I bought some more just like what I already had inherited, and kept on buying until I had nearly one hundred acres of land and a mortgage of $4,000. The mortgage gave me more trouble than the farm.

Now, friends, if you have ever been depressed with debt, if you have ever sat on the fence and sweat as it were great drops of blood thinking of the interest you were paying, then you know something about my feelings; and I remember one day sitting on the old rail fence and soliloquizing, and I said to myself; "Why, two can carry a load a good deal better than one; I've been carrying this load alone for several years and I know that two can carry this load easier than one;" so I went across the country twenty-five or thirty miles and I made the most liberal proposition to a young lady that any young man ever did. I said, "Here, if you will come over and go in partnership with me, I will give you a full half interest in a $4,000 mortgage. I did, friends, and I have no respect for the young man who will go away from home and get a wife without telling her or the young lady all about his financial circumstances. Now I became, as I say, interested in this, and I tell you this story because I perhaps may not be able to convince you that I understand the subject. I want you to know, friends, that I have had something to do with poor land.

The factors controlling soil fertility is the subject under discussion, and the first one to which I want to call your attention is that of drainage. Notwithstanding all that has been spoken or written about soil fertility, the fact remains that our lands are becoming less and less productive, but the population is increasing at a rapid rate and all the people must be fed from the soil. Farmers are depending largely upon the purchase of commercial plant food to maintain the fertility of the land, and in many cases, the last state of the soil is worse than the first. But few farmers, comparatively speaking, have understood the fundamentals of soil improvement. The essentials of fertility that I shall discuss in this paper are drainage, lime, organic matter, tillage, manures, and commercial fertilizers.

There are thousands of acres of unproductive soil soil because drainage is needed. We never thought, my friends, that upland or rolling land often needed drainage, and yet it is true that some of the worst water logged soils I have seen within the last few weeks in traveling over farms, was on the upland, and lands the character of whose subsoil was such that the water could not get down through it; you might say it would run off of it; yes, but we want it to run through it. My friends, a water-logged soil is not benefited much, or a soil is not benefited much by the water running down over it.

There are three essentials of plant growth, viz, heat, air and moisture, none of these are found in proper proportions and in right conditions, in a water-logged soil. Not only are level lands in need of drainage but many of our rolling lands. Because water runs off the land is no reason why it is properly drained. The water should run through the soil. Erosion is one of the means of depleting a soil. If the land is underdrained, this erosion is not half so serious. When water runs down through a soil the plant food is strained out, so to speak and left where plants may get it.

*How to Drain:* Any method of drainage that will carry the water off the land is to be preferred to no drainage; but that system of drainage that will not only carry the water off but will aid in soil secretion most, is the best method. Underdrainage, therefore, is always to be preferred to open ditches. How deep should the ditches be cut, how far apart and what size of tiling should be used, are questions that farmers often ask. There are two things that should determine the depth of the ditch,—the outlet and the character of the soil. Of course, the outlet should be lower than the ditch, and if the soil at a depth of 2 1-2 feet is an impervious clay, then the ditch should not be cut more than one half the diameter of the tile into this clay. The reason for this is that there is danger of the tile being sealed up in this clay so that water will not get into the tile freely. The distance of the tile apart depends upon the depth of the ditch as well as upon the character of the soil. A ditch three feet deep will drain back about 25 feet, but if the soil should be an impervious clay then the ditches should be closer, for the reason that the water will be too long in getting off the surface. The size of the tile depends upon the volume of water to be carried off. Ordinarily if the mains are laid with 6-inch tiling the latterals should be 3 and 4 inches. I would not recommend the use of tiling smaller than 3 inches. Again, if the fall is great the tiling may be smaller than where there is less fall for the water will get out sooner.

*Lime:* After the land has been drained the next step to be taken is to apply lime if it is needed; and on most of our soils the need of lime is very apparent. The older our lands become the greater will be the need of lime, for it is one of the elements of plant food that is all the time leaching out of the soil, and I might add, in this connection, that the more we leave our lands bare the greater will be that leaching.

*How to know that the land needs lime:* The presence of weeds where domestic plants should be growing is an indication. The failure of clover to row is a beter indication and the reaction of the acids upon blue litmus paper is one of the most accurate when the test is properly made. Having determined that the land needs lime, the next step is to apply it in the right form and proportion. The old adage that, "Lime makes the father rich and the son poor," grew out of the excessive use of lime. Lime is a stimulant, and over stimulating always results in weakening the stimulated. Years ago little lime was used, except in the burnt form, but of late years we are told that the form matters but little only as it effects the price. Ground limestone, if ground fine enough, is just as effective as any other form, and when it can be purchased for half that the quicklime costs, it is to be recommended. The amount to be applied depends upon the acidity of the soil; but an application of from 1,000 to 2000 of the quicklime and twice that amount of ground limestone is sufficient in most soils except where alfalfa is grown, and then more should be applied. When possible, this lime should be put on plowed ground. It may be applied to sods with great benefit, but under no circumstances should it be turned down immediately after being spread. It is better to apply small quantity often, than large quantities at longer intervals, for the reason that less loss will be sustained by leaching.

By organic matter in the soil, we mean anything that has had life in the past, whether that is animal or plant, and has died and gone into the soil. If you will take samples of soil from the primitive forest and from the depleted soil to the chemist he will find by analysis that there is little difference between the plant food content, but he will inform you that the new soil contains from 12 to 14 per cent. of organic matter while the old soil has from 2 to 4 per cent. only, herein lies the difference in production. Naturally the plant food in the soil is unavailable to plants but the decay of vegetable matter in the soil forms certain acids which act in the same way upon the raw plant food that sulphuric acid acts upon the phosphate rocks of the South—makes the plant food available.

Our lands, therefore, are largely productive in proportion to the amount of organic matter they contain. If organic matter is so important in the soil, then our rotations should always be planned with the view of replenishing the soil with all that we exhaust in cultivation of the same. One of the most practical ways of doing this, is by following a short rotation in which cover crops and heavy sods are turned down. If the farm manures and commercial fertilizers are used on the soil, improvement of crops, and by these I mean crops, that will add organic matter to the soil, the organic content may often be increased and still good crops grown and part of them removed. The application of 100 nitrate of soda per acre on a timothy sod will, not only give the farmer more hay, but it will give him a much thicker and better sod to turn down, and he will add more organic matter to the soil by so doing. No rotation is perfect that does not include one legume at least; two are better, if it can be arranged. One common mistake, andone that has contributed as much toward soil depletion as anything else, is the method of leaving fields bare through the winter. Not only is plant food lost, both by erosion and leaching, but the opportunity is lost of adding organic matter to the soil at very little expense. The slogan of every farmer should be, "Get more organic matter in the soil."

*Tillage:* In former years we tilled the land to keep down the weeds. That is still one subject of tillage; but it is the most remote one. The objects of tillage named in the order of their importance, are as follows: (1) To conserve moisture; (2) To make available plant food; (3) To aereate the soil and (4) To kill weeds. No matter how much plant food we have in the soil, if there is no moisture, the plants cannot use it. By a proper system of tillage, we form a dust mulch on the soil which, like a blanket, prevents moisture from escaping. The careful farmer sees to it that this dust mulch is preserved in his field and after a rain which has formed a crust on the top, he goes into the field to break the crust and reinstate the mulch.

*Making Available Plant Food:* As has already been stated, the plant food in the soil is unavailable to plant in its natural state. Thorough tillage breaks down the particles of soil and makes plant food easily soluble for the plant. In this sense, it may be said that tillage is manure.

*Soil Aereation:* Plants must have air if they are to live. A part of this air must be taken in by the roots. Air cannot enter an impervious soil, hence the soil should be stirred frequently to let the air in. During the hot days in the growing season the soil is heated, and hence the air in it also. At night the air above the surface cools off and, being heavier than warm air, falls to the ground and crowds out the warm air. In this way the air is changing every twenty-four hours and the soil is being aerated.

*Killing Weeds:* A weed is a plant out of place and, as such, they are trespassers and should be destroyed. The best time to kill a weed is when it is just opening into life. Constant tillage catches these trespassers before they are deep rooted and hence they are, by this method, easily destroyed. If we properly till the soil to conserve moisture, make available plant food and aerate the soil, we will have but few weeds to destroy.

*Manures:* I have thus far discussed some of the means by which the plant food of the soil may be made available. I now want to call your attention to the matter of supplementing the natural strength of the soil. Whenever I find a livestock country, I invariably find a more fertile soil than where little or no livestock are kept. This is due to the influence of the manure upon the soil, but in no country do I find this influence half so potent as it might or should be.

To fully and justly appreciate the farm manure, is a lesson that many farmers have yet to learn. One needs to travel but a short distance by rail or otherwise through an agricultural section to observe a woeful waste of farm manure. It is not as bare as it was ten years ago, but it is yet intolerable. The manure from a well-fed horse is worth at least $26.00 per year and that of the cow more than $20. One fact in regard to the value of manure that has been overlooked by many is, that the liquid manure contains 65 per cent. of the plant food of the excrement of the animal, and yet comparatively few manure farmers make any attempt towards saving the liquid. The Ohio Experiment Station proved that a cement floor in a barn would more than pay for itself in two years. Another source of great loss in manure is that of the ammonia. When manure heats, a great deal of the ammonia passes off. To prevent heating, keep the manure well tramped, or mix the cattle manure with the horse manure.

When, where, and how should manure be applied are questions that many farmers ask. There is no longer any doubt but that manure should be applied as soon as made. There is always a loss when manure is held. Manure cannot be applied to any crop without giving good results, but what the present farmer wants, is the best possible results. The reason why manure gives better results than commercial fertilizers is, that it contains organic matter and, as has been previously stated, organic matter is what the soil most needs. If manure, therefore, can be used to grow organic matter for the soil, the results will be still better. By using the manure on the sods, a better sod will be had to turn down. This, in my judgment, is the best place to apply manure. It may be used on any other crop that is to be turned into the soil, such as rye, crimson clover, etc.

The mistake has been made in the past in applying large quantities of manure. If eight tons of manure are available and we have two acres needing it, better results will be obtained by top dressing the two acres rather than by putting it on one acre. Manure is rich in nitrogen and potash and poor in phosphoric acid. It will pay, therefore, to reinforce all the manure with this element since plants, like animals, require a balanced ration. If forty pounds of acid phosphate are added to every ton of manure, it will be worth to the land one dollar more after paying for the treatment. This is the finding of the Ohio Experiment Station.

*Commercial Fertilizer:* After every means of making plant food available in the soil has been employed, then, and not until then, is the farmer justifiable in purchasing commercial fertilizers. The farmers of the United States spend annually more than three hundred million dollars for commercial plant food, and it is safe to say, that by the injudicious use of the same, more than half this money is lost. Farmers buy the same kind of fertilizers for all kinds of soil. Take our heavy clay soils and there is in the surface foot on an acre, thirty thousand pounds of potash and the second foot contains nearly or quite as much. It, therefore, stands to reason that a heavy clay soil does not need potash. "But," says one, "I have used it on such a soil and gotten good results." Then it was on account of the potash in the soil not being available. The means for making available plant food had not been employed.

Another source of loss in the purchase of commercial fertilizer is the low grade purchased. Thousands of tons of fertilizers are sold that do not contain more than eight or nine pounds of plant food. The freight and bagging of this low grade costs just as much as in a goods containing twice the amount of plant food. Fully one-fifth of the cost of fertilizers could be saved if farmers would purchase the chemicals and do their own mixing. Recently a dealer showed me a fertilizer containing 8 per cent. phosphoric acid and 5 per cent. potash which he sold for $23.00 per ton; but he also sold acid phosphate and nitrate of potash, and at his price on these goods, I could have bought them and made a fertilizer containing the same analysis for $13.50. If farmers will use plenty of lime, it seems that they have but little use longer to purchase nitrogen, for they can grow it so much cheaper.

Then with a clay soil well filled with organic matter, there is little need to purchase anything but phosphoric acid and there will never come a time when we will not need to purchase this element. Why should we give attention to all of these details? First, because it will increase our profits on the farm; second, because if our farms are productive we get more pleasure out of our business; and, third, because we owe it to the future generations to leave our farms in a better condition than when we took charge of them.

We are leaving the land bare. We must necessarily, unless you sow some cover crop to grow in the fall ,you must necessarily leave the land bare through the winter, and I would rather have a crop of wheat growing on my land than have the soil bare from the time the corn is taken off until the oats are sown in the spring. But something should be put there, if it is nothing but rape or a little bit of rye, something to grow there to catch the leaching plant food and vegetable matter and keep it in the soil.

The CHAIRMAN: What is the best thing we could plant under the circumstances?

MR. ZINN: If you can grow it, crimson clover or hairy vetch are two of the very best things, because, while you are adding organic matter to the soil, you are also taking out of the air some nitrogen that costs us so much when we buy it. A Virginia farmer told me about owning a hundred acres of land, poor land, and he owed a thousand dollars and the tears almost came in his eyes while he was telling me about it. I said, "Mr. Jones, I don't think you are as poor as you imagine you are. On every acre of this land, for the depth of one foot, you have at least thirty thousand pounds of potash." It was a heavy clay soil in the Piedmont section. "You have some twenty to thirty thousand pounds of potash; you have about three thousand pounds of phosphoric acid, and resting down on every acre of your land, you have about ten million dollars worth of nitrogen and yet you have been buying that very element for years and years." And that's true of your farms here and it seems to me that we ought to utilize some of this ten million dollars worth of nitrogen, and we can only do it be growing leguminous crops, crimson clover and hairy vetch. Sow a little hairy vetch, and next year try it again.

A Member: How much seed to the acre?

MR. ZINN: If you are sowing that alone, half a bushel to the acre, but I would not sow it along, sow it with rye. Only this week at Bethany College, West Virginia I saw them turning down hairy vetch this high with rye.

A Member: How much rye to the acre?

MR. ZINN: I sow two bushels of rye to the acre. My seeding is this; we sow half a bushel of rye, a gallon of rapp seed—not a gallon. but two or three pounds of rapp seed, and a gallon of hairy vetch and about a gallon of crimson clover. I will give it again; half a bushel of rye, a gallon of hairy vetch and crimson clover and two or three pounds of rapp seed to the acre, and I often say— and never say it but what I think of Mr. Seeds—some cowhorn turnips if you can get them.

A Member: Do you think that the land laying bare in the northern part of the State is as bare as in your state?

MR. ZINN: Not quite so bad, but you are losing some all the time, not only by leaching and erosion, but you are losing the golden opportunity of getting vegetable matter in the soil, and if you don't grow more than six inches of this and turn it down, you are getting several times the cost of the seed. The Delaware Experiment Station sowed crimson clover the 2nd of July and I have tested it the 2nd of November and found it had gathered $8.35 worth of nitrogen, not all from the air, but it is very fair to presume that they got half from the air, and that would mean that more than $4. worth of nitrogen came from the air, besides the organic matter that is added to the soil.

A Member: Tell us when to sow that mixture of seeds?

MR. ZINN: Sow it at the last working of the corn. If I am growing rye alone, if I could get the corn off early enough, I'd rather sow the rye after the corn has been removed, because I have had some disappointments in sowing rye in corn. Sometimes, if it is very dry weather, you won't get much rye, but if you mix the rapp and cowhorn turnips, and hairy vetch and crimson clover, you will have one or the other.

MR. J. ALDUS HERR: We, in Lancaster county, have always had a failure about the first of July. If we sow it as soon as we can get our corn away, nine times out of ten we have a success. Crimson clover has been a failure with us three to one, and vetch—we tried it three years and failed.

MR. ZINN: My recommendation is to sow a little vetch and thereby get the soil inoculated. I failed signally when I attempted to grow a crop by sowing it alone. The crimson clover is very much like the hairy vetch; it requires soil inoculation also.

Now I am glad to be interrupted. I will quit when the time is up, whether I get through with the subject or not. There's a whole lot of things I'd like to say about organic matter in the soil. I must say this; I believe we make a serious mistake when we sow that ground down to grass. We mow it just as long as it will pay to mow, and then, because it does not pay to mow any longer, we plow it. If we keep that up, we will never improve our soil because we are not adding organic matter to the soil by that rotation. When you plow down sod from which you have cut three or four tons of hay, you are adding to the soil almost three or four tons of organic matter, not quite as much in roots and stubble, but if you allow that to run out until you don't cut but half a ton of hay, then you are adding only half a ton of organic matter, and it is organic matter—if I don't say anything else—it is organic matter that our lands need worse than anything else, worse than commercial fertilizers.

A Member: If you let that go and get into blue grass and let that lay, will that still add?

MR. ZINN: It won't add as much as if you have a good heavy sod. In order to do that, if I meant to allow that to grow up in blue grass, I would use manures and commercial fertilizers on blue grass sod, so that when I did plow, I would have a good sod to turn down. I believe you will get better results from the fertilizers and the manure than if applied in any other way. I never would have gotten started if I had not had to depend on commercial fertilizers to some extent.

A Member: Mr. Zinn, I am not a farmer, but I have a garden. I sowed it in clover this year; what will I do with that this fall?

MR. ZINN: You don't want to plow it this fall?

A Member: No, sir, I just want to know what to do with it.

MR. ZINN: Fertilize it, have it grow as much as possible and turn it down in the Spring. Now, friends, this has been a very rambling talk. I feel like you have been so patient and have listened to so many good speeches, that I will not trespass further on your time. I have only touched the high places in this talk. I thank you for the attention you have given me.

(Adjourned to 7.30 P. M.)

Wednesday, May 21, 1913, 7.30 P. M.

Mr. S. C. George, West Lebanon, Chairman.

The CHAIRMAN: The Institute will please come to order. Owing to a little misunderstanding between the Department and Dr. Holmes, Dr. Holmes failed to get here yesterday evening, as you all know, and is here this evening. His subject will be taken up first, and then we will proceed with the regular program of the evening. I now have the pleasure of introducing Dr. Holmes, who will speak to you on the "Country Boy."

Dr. Holmes addressed the Institute as follows:

## THE COUNTRY BOY

By DR. A. HOLMES, *State College, Pa.*

Ladies and Gentlemen of the Institute: I am sure it gives me a great deal of pleasure to stand here to-night and be permitted to occupy a place on the platform. I am sure that what I have to say will be somewhat discounted on account of the fact that you are a disappointed audience; I feel that as well as you feel it.

I want to talk to you to-night about what I think, of course is the most important product of the farm, in fact the greatest asset of the country. While I myself happen to be a father and not farmer,at the same time I believe that I have had something to do with raising a crop in this country, that, after all counts for more than any vegetable or any other kind of crop or animal, and that is the country boy, so that while I am a specialist and in a sense, a psychologist, I want to talk to you about a perfectly clean cut, concrete topic. I want you to understand what I say to-night. It is always difficult, of course, when a specialist, especially a psychologist, talks, because somebody has said that talking on psychology is discussing a subject about which everybody knows in terms which nobody understands. My first endeavor then, will be to make you folks understand, because I don't want you to be like a man down in Philadelphia who swallowed a dollar and has been guessing ever since whether he is a dollar in or dollar out. I understand, in the first place, that I am talking to plain people without and preternatural convolutions. You needn't bother about that, it doesn't mean anything in particular; I said it to break this machine that is going in front of me.

But I want to make clear to you in the first place such a simple thing as what a country boy is. Did it ever occur to you that, as a matter of fact, we so far haven't got a definition of a boy or of a child. The only science that understand to define a child is the legal science, which calls everybody an infant under twenty-one, so that an individual, a boy is an infant until he is twenty-one. He may be twenty years of age, eleven months and 29 days, but he is an infant, and then when he has passed over the next day he is a full grown man, so we don't have any clear definition of what a boy is. I want to talk to you a little while about how the mother looks at the boy, how the father looks at the boy and then how the new science of child study looks at the boy and especially the country boy.

I think the mother looks at him as a little angel. I saw a series of pictures of the boy as he appeared from different viewpoints. As the cook saw him, he was large and round and fat as a great big porker, ready to eat anything and everything. As the cat saw Johnnie, his hands were as big as hams when they were after the cat. As his mother saw him, Johnnie was a little angel with halo above his head, and Johnnie, as the neighbors saw him, had a spiked tail, claws on his hands, cloven hoofs and horns beginning to appear on his head. And so I say that boys vary with the viewpoint. From her viewpoint, the mother looks upon him as a little angel and I doubt whether anybody else in the world does.

If I had time, I might arrive at the point where I might say to the mothers of the land, "There must come a time when your boy, whom you love with all your heart and soul, will reach a period in his life when you will have to let go of him more or less. He will come to the age of 12, 13 or 14 when he is going to step out and be a man." I have heard of a mother found in tears by a neighbor, and when she was asked, "What is the matter, Mrs. Jones?" she answered, "Oh! I have lost my baby." The neighbor knew there was only one boy in the family, and asked, "What's the matter, what in the world has happened?" "Why, this morning, my boy, six years of age, started off to school." There was the mother broken hearted, weeping over the fact that her baby was gone.

Well, there is a greater tragedy to come in the life of every wise mother, and that is the time when the boy has reached the age of 14 and for the first time in his life steps out into a man's estate, for a woman cannot follow him there because the ways of men are and absolutely must be unknown to a large extent to women. You know we men have always confessed our ignorance concerning the fair sex, but on the other hand it is just as true that you never, in this world, can follow a hearty boy into a man's estate. The father is very likely to make a mistake about a boy. I think in America most of our fathers neglect their boys. One of the difficulties we have in this problem of social uplift is the fact that the fathers of American boys are so busy earning dollars and cents that they haven't time to take care of their boys. Now I don't believe that the mother can take care of a boy altogether even from the time the boy is one year old up to twelve; I know she cannot take care of him altogether after he is twelve; and I don't believe there is any tragedy in this country so great as for a man to put all of his energy into his business —it may be a farm, he may start out as a young man with great ambition and determine that he is going to add acre to acre, that he is going to have the finest stock, that he is going to have the finest orchard in the country, that he is going to be known for his cultivation of his fields, and then after while find out that the greatest asset of his farm has been absolutely neglected.

Business men, I know, are doing that all the time. You hear of tragedy like that every day. I heard not long ago of a man who was as busy as he could be trying to get enough money to give his boy some clothes and something to eat and a roof over his head, and when the boy grew to be 14 or 15, the father found out that the boy was slipping down and down. His mother could not hold him, his father had lost his grip and that man knew that if he stopped his business for a month or two months or three months, it would cost him thousand of dollars; but he made up his mind that the only thing he could do was to stop, so he stopped and he and the boy went off for a vacation of three months on a lake and there the father went back to his own boyhood and they hunted, fished, swam and camped together, sat around the fireside and talked together, and at the end of three months that boy was back to his father's heart and that father had spent three months in cultivating the most magnificent product there is in this country. You look upon your boys more or less as assets and try to think of them in terms of dollars and cents. We are that way in this country; I am sorry we are, but nevertheless we are, and I want to say to you, just a word or two, about the value of some of our boys in this country.

Do you know that there are about 250,000 babies born in the United States every year, and do you farmers know and do you stock raisers know, you who are so careful about your efficiency in raising your stock and bringing them to pasture, that by the time the children who are born this year will be 23 years old, 50 per cent. of them will be dead and buried under ground? Half the crop of babies every year is a total loss before the time they are 23 years of age. By the time that money, and time and energy have been put into their cultivation and their education, they are gone—half of them gone. Out of all those that are born, there are only about five hundred and fifty thousand male workers left; out of the crop this year there will be only about five hundred and fifty thousand men workers ready to go into the world and earn their living when they are twenty-three years old. Out of that number about half, we will say two hundred thousand boys, are in the country, for it is still true that about 50 per cent. of our people are country people; so we have a crop of about two hundred thousand boys growing up every year.

What are two hundred thousand boys worth? Those two hundred thousand boys are worth about $8,000,000 a year, that is they add about $8,000,000 worth of wealth every year to this country. You immediately want to deduct the board, etc., the cost of that worker, but you don't do that when you raise stock. When you raise stock, you simply count the gross result. These two hundred thousand boys will add one billion six hundred thousand dollars every year to the total wealth of this country and if they are carried over thirty years, these boys will be in round numbers worth about fifty billion dollars. The yearly crop of boys, country boys, in this country, reduced to dollars and cents, is worth about fifty million dollars. I wish I had time to show you this fact, that if you farmers will take the best asset you have on your ground and send that boy out and give him a first class education, that instead of making about $588 a year for his income, for his own personal income, not the wealth produced by his hands which somebody else gets a part of, but for himself, he will make about $588; whereas, if you give him an education, he will go out and make about 1,188 a year, every year. That boy will be worth about $600 a year more to himself with an education than without it.

Now I put this thing down on the American basis, a pretty low basis. On the other hand, I would like to say to any man, that the biggest assets you have for your own education in your home is your own boy, and when you can sit at the feet of your boy and learn something from him every day, then you will really find out the value of the boy; for in the first place, the thing you will learn is the enlargement of your heart, the chance to pour out yourself to somebody you love, it doesn't make any difference whether you ever get any return in dollars and cents or not. You men have boys, and rating those boys and telling those boys daily that you expect them some day to pay you back the money you are putting into them—when you do that you are laying for yourself in the future the foundation of almost illimitable sorrow. Some of these days those boys will profit by the teaching you are giving them. Do you know that if you talk to your boys along this proposition, "My son, when you were a baby I cared for you, when you were a boy and couldn't work, I clothed you, when you were a young man I sent you to school and all of these years I have given you a house, given you something to eat, put food into your mouth and clothes on your back and when you get ready to work in this world, father expects you to support him;" I want to say to you, beware, your boy will grow up with that kind of an education and put it into practice and the day will come when he will give you a living and that's all on this earth he will give you.

Did you ever hear that story that George Ade tells about the young man that was brought up right by an American father said he didn't believe in such tom-foolery as Christmas time, didn't believe in wasting his money on such sentimentality as presents and every year when Christmas time came around the father took ten dollars and put it in the bank and the boy and he sat down together and figured out what the compound interest would be and enjoyed their Christmas in that way and didn't waste any time eating or drinking, and the same thing was true when the Fourth of July came around, and finally the boy grew to be twenty-one and the father had taken him into business with him and the boy had put out the money he had at compound interest and went into partnership with his father and it took only three years for him to crowd the old man out of the business and possess it all himself, every bit. Then the old man protested and said, "Son, how could you be such an ungrateful son as you are?" The boy said, "Ungrateful, don't talk to me about gratitude; this world is made up of dollars and cents, and whatever the cash register says, that's all the tale there is to tell."

And the moral of it was that if you bring up a tree, the way the sapling is bent the tree will be inclined, and that is just as true as anything on this earth can be; and I want to say to you fathers tonight, I believe that one of our great difficulties in this country is that the father is so busy making enough money to buy bread to eat, getting a house, getting the boy clothed, that he forgets that the finest and best education on earth that a boy can possibly have is to learn by sympathy the gratitude and love and kindness and tenderness and mercy that are thrown out that are thrown out into this world without any idea of their ever coming back in dollars and cents and are the finest things in life; so I want to say tonight to fathers who do love their boys, and of course you love your boy, but for Heaven's sake don't get so busy with the cows and horses and pigs that you forget you've got boys. Why is it you fathers must live way over there by yourself? What do you live way out there for? "Because I've got to be near my horses and my cows and my pigs and so on." Don't you think anything about the children that are growing up in your home? Do they want to live there? Do they want companionship? Do they want opportunities for education? Why in the world don't you run your farm out there and buy an automobile and ride into town and live in a suburban town at night, stay there all night like a civilized man with your family and next morning get into your automobile and go out there next morning and go out there to your farm? "Heavens and earth, you'll wreck the country." Let her be wrecked. I'd just as leave let this country be wrecked as to be constantly bringing up boys that are going into our institutions, our insane asylums, our penitentiaries, our feeble minded institutions and places of that kind. I just want to throw that out to you fathers. I am so deadly radical, so idealistic, that I don't believe it is at all necessary for a farmer to live way out in the woods on account of his cats and dogs and horses and swine. A farmer ought to make up his mind just as a business man does to have some place he calls home, and then go to his work.

Well, I guess I'll have to talk about the country boy as he really is. I think maybe I'd better get close home to my subject and stay there, because if I get on the subject of a farmer's home, a subject that I love with all my heart, soul, might and mind, if I get on the subject of fathers and mothers, I will stray far away from the subject I am really on, and when I have strayed for away, I always come back and feel sorry about it at the end of the speech. I am like the man that got married. When the ceremony was over, he was about to throw his arms around the neck of his bride, when she said, "Hold on." "What's the matter, Maria?" "I made up my mind that I am not going to be like other women; I am going to have an income of my own; I'm not going to come to you every time I want a quarter and ask you for a quarter, so every time you kiss me, you've got to give me a dollar." So the young fellow didn't know what in the world to think, but he was very much in love and very foolish and so he agreed and the lady, the first year, had a good income. The next year, and the next, it fell off a little bit, but they got along nicely and he went into business and one day he came home and said, "Maria we are ruined, I've lost everything in the world; the house is gone, the furniture is gone, the carriage must be sold and everything." She said, "John don't be so discouraged;" and they rode around the town and finally they came to a house sitting back on a lawn and she said, "How would you like to live there?" Don't torture me," he said, "you know we can't go there." "Yes we can." "How is that?" That is my house." "Where did you get the money to buy that house?" "You remember that every time you kissed me you gave me a dollar; I put that money out at interest and that is my house; I bought it with the proceeds." And John's head went down, he looked at the floor. She said, "John, what's the matter, you don't sem to be very happy about this." "No, I was just thinking of what a fool I'd been for not having done more of my kissing at home." If I wander from my subject, I always feel like that man, I wish to goodness that I had done most of my kissing at home.

So I'm going to tell you what I really think a boy is from the philogenetic or genetic point of view. There is just as much difference between a boy and a man as between one kind of a dog and a wolf and there is as much difference between a boy who is sick and a boy who is well as there is between a bull dog and a shepherd dog. There isn't a man who can take hold of a shepherd pup and make him into a rabbit hound. You can break him in and make a sort of an imitation out of him, but he will be a mighty sorry sort of a dog. There are certain primitive instincts that must work themselves out and unless they get an opportunity to do that, if they are thwarted, the result is a no-account beast. I saw a little dog of that kind one time; it was in a cow patch. The cows did not belong to the master of the dog, a shepherd dog, and every time he began to follow his instinct and run after the cows, they had hauled him up and tied him to a post and after a while he was a splendindly broken, well trained dog, wouldn't look at a cow, and I remember that dog when it grew up, wouldn't come around the house, wasn't any good at night as a watch dog and you'd find him lying out in a plowed field all by himself. He wouldn't come when you'd call him and I wondered what he was doing at night, because he slept all day and wasn't around the house at night; and after a while I noticed that his nose and paws were all muddy and one day my brother and I saw the tracks of this dog, the only one of the kind in the country, such a perverted brute, so well trained that he wouldn't look at a cow and lay around in the day doing nothing, and at night that dog prowled all night long up and down the creek routing out musk rats. We have taken our boys that have a nature, and instinct that belongs to them and tried to turn it and shape it to make it suit us.

I want to leave this thought with you tonight; if you've got a boy at home on your farm, for Heaven's sake don't try to save him from the foolishness you went through yourselves. He's got to go through it. Let me tell you people tonight, you are no better than the young people, not a bit. If you could go back for a minute and your bodies could be made young again, you would be as foolish as they. You'd go out and dance all night till three in the morning. But there's something gone out of your system, your psychology, your mentality. You think anybody that does that is foolish. You want to take the young fellow today and make him a different young man. It is absolutely impossible. You were the foolish fellow you were at 16, 17, 18 because your father was, and your father was what he was because his father and grandfather was. That is the first proposition I want to lay down.

You may change this country, you may climb up the sides of our mountain and sweep them clear of their timber and the rains will descend and the floods come and move the mightiest works made by the hand of man or God, you may blast away the mountains, dig tunnels through them, harness the mightiest rivers and if you please, the tides of the very ocean, but believe me you cannot change the nature of a boy; he is going to have his way in this world as sure as you are born, and if you try to thwart it you will fill these institutions like the one across the street. I saw over there tonight three or four little children playing in the street on the cobble stones, while two puppy dogs, following their nature, were engaged in a perfectly riotous play on the green grass. Why, those boys would have been taken up and put in that penitentiary over there if they got on the grass; dogs on the grass were all right; but you keep the boys off the grass. That's what we are doing all over this country, everyone of use, especially in the cities.

I haven't so much to say against the country. A boy naturally finds in the country the environment he wants. He finds there the kind of environment that fits his nature. The country fits the boy to perfection. The trouble with the country is, father and mother, because they don't understand that when Johnny wants to go fishing he is doing something that will educate him more than anything else. Let me, for an instant, go through some of the stages through which your boy is likely to go, for this is what your boy is, mother; you know that nice little angelic baby of yours, that little baby is a savage, he is going to be a savage and going to be a barbarian, he is going into the nomadic period, then into the agricultural stage, and then he will develop into the chivalrous stage, and then into a 20th century man. Roughly stating, that is true. I am not going to insist that that is absolutely true. Your boy is going to begin as a savage, then going into the barbarian period, then going into the nomadic period, then into the agricultural stage.

Way over there in Brooklyn, New York they took me and showed me with a great deal of pride a little plot of ground, about this big, where they were letting the children born over in New York and whose parents perhaps have been in the country for centuries, letting those children express, as far as the poverty stricken city can, the primitive agricultural instinct in the children. Why, there is a period in life when everybody who is normal would be a farmer. I could take every boy in this country, except a certain small percentage, and make a farmer out of him and he'd like it better than anything else in the world. Our schools haven't found it out. They are trying, in advanced schools, to come somewhere near it, so they give little children these little gardens, taking hold of this primitive agricultural instinct.

When you have a boy to begin with, remember you've got a savage. Don't think because you are a Christian man and a Christian woman because you have a Greek education, because you have gone through cultural periods, that therefore your boy is going to be born up here where you left off. Nothing of the sort; he is going to be a little savage, and the thing you've got to do is to let him work his savagery out in play. In 1780 Dr. Rush of Philadelphia said that the Moravians give their children all of the necessary manual exercises in the simple form of manual art. I went there the other day and they have a magnificent brick gymnasium, and there they are letting their boys and girls play. Why? Because they have found out that play is absolutely the best education on earth for the growing boy. If you stop that boy from playing, it's sure as can be you are hurting him all his life. He must play, he is bound to play, and when he begins to play, his little instincts crop out. He wants a bow and arrow, he wants to hunt and shoot and chase, he wants to play hide-and-seek, because our ancestors made their living by hunting and chasing and being chased and the same sort of instinct is going to crop out in our boys.

Notice in the first place what a magnificent environment the country is. Every once in a while I hear people in the city bemoaning the fact that so many of our children have got to grow up in the country. They think that because anybody grows up in the country, he hasn't got a chance; but you go right down in the city and look at those poor children. The other day I rode out on the East Side of New York in the railroad train and saw those poor children out there playing, watching with one eye the policeman and watching with the other for somebody to chase them, and snatching in that way little bits of the play that their life desires. It is only natural for boys to want to throw and play ball. Why? Because, way back in their own ancestry, when our folks were hunters, the man who could throw and throw straight and throw quick brought home a dinner to the family and his offspring succeeded, they survived because they were the fittest or had the fittest father, and as a result the boys whose fathers were strong, straight throwers and quick throwers have survived. A boy throws, you know, instinctively; a girl can't throw, she has to learn, and a woman never has learned to throw. Why? Because their mothers didn't have to throw, but their fathers did and the reason you and I are here tonight is because we had fathers who were first class throwers. They threw with a club, they threw with a sling and threw with a stone, and the right arm of your boy has something in it that makes him want to throw.

Suppose you have got a boy walking along the road with gravel on the side of it and suppose right over here there is an impudent pane of glass staring out of an empty house, what is he going to do? There's a policeman on the corner, but it doesn't make any difference, he is going to throw. If he is out in the country, he can throw. A boy can throw in the country and nobody bothers their head about it, they praise him for it and quite rightfully. Suppose he is in the city where no boy has any business to be; when he is a city lad, he hasn't a chance to work that off unless he can do it in a back alley, unless he gets out and snatches up little pieces of clay in the alleys or gets on a city play ground that is already crowded. Over in New York City, Miss Farrell, who teaches children, had a boy that would throw. She got him up one day and said, "I understand you threw and broke a pane of glass?" Then she sent the janitor and had him set a pane of glass up in a chair and said, "Johnny, here's the ball; let's see you break that pane of glass." He was so astonished that at first he didn't know what to make of it, but after a while he bolted away and broke that glass into a thousand pieces. She had established a point of contact between herself and Johnny and could sit down and talk to him about destroying property. She told him that if he wanted to throw, to throw a ball on a base ball diamond and if he wanted to break glass, to pick out the beer bottles and break all the beer bottles in the world and it wouldn't make any difference if he did. When she said that, she made a point of contact with that boy and was able to get hold of his soul because he saw she was a woman who understood boys.

Now I want to take up the nomadic period. There is another stage in a boy's life when you could make every normal boy in America a cattle raiser, if you drilled him right. He would become a cattle raiser because our ancestors went through that stage when, instead of going out into the world and killing animals, we domesticated them. And so you will see a boy reach that stage where he won't like horses or cows, if he loves any kind of animal, it will be a dog. I want to tell you that if you bring up your boy without association with a dog, you neglect his education, he never will make the kind of a man he ought to be unless he has gone through association with a dog. If you can grow up with a puppy dog, so much the better, it's better than learning Greek; and I'm glad I learned Greek, but a whole lot gladder that in my lifetime I had a dog and he and I grew up together and there are lots of things I learned from that dog. I remember the one thing I learned was how to be a father: He was given to us by a farmer who didn't know anything about dogs, and that dog, being a perfectly sane normal dog, ate eggs. Eggs were good to eat and he ate them; it showed he had good sense. A puppy dog that won't eat an egg hasn't got good sense, and this dog had good sense, so when he found a hen's egg he ate it, and the farmer said, "I wouldn't have that kind of a dog on the place." I found a way to break him of eating eggs. I punched a little hole in an egg and put some cayenne pepper on the inside and after a while he saw it and ate it and then there was a circus. Now when that dog sees an egg, he will go around it in a circle and bark at it, but he has learned something. We said, "What are we going to do about this puppy dog to train it?" Finally we made up our minds to pet our dog as much as we could pet it and then, when we wanted to punish him, we would simply cease petting him, and that plan worked all right and I've got a boy at home and I do exactly the same thing with my boy. I learn more about how to bring up a boy from learning how to bring up a puppy dog than from all the studies I have ever had and all the colleges and universities I have ever attended; so that tonight I have even got to be careful about my boy because I am afraid to say anything in criticism, because he feels it.

I learned that lesson from a dog, and I say that a man who misses lessons like that has missed something fine, strong and beautiful out of his life. My own boy went through exactly that same stage. He wanted a dog and got a dog. My boy, like every other boy whose father and grandfathers were born and lived in the woods for many, many years, when we lived out in the woods, not here in America but over in the woods of Germany and Northern Europe; when we were out there and our children wandered away from the firelight at night, a wolf came along and grabbed them up, and as a result, the child that was afraid of the dark was the one that succeeded, the one that survived. Your fathers were what they were because they were children that were instinctively afraid of the dark and that same thing comes down in our children today. You think that it is because you tell ghost stories to children that they are afraid of the dark, but that is not true, it is because in our earlier history, the children who were afraid of the dark were the only ones that survived. If we went to work to club that boy into shape and punish him for being afraid of the dark, we would only make him a thwarted thing, so we let him alone and get him a puppy dog and had tied him up down in the cellar. That boy wouldn't go down in that cellar at night for a hundred thousand dollars, he wouldn't go down there for anything in the world, and for three nights the dog went down and finally my boy said, "You aint going to treat my dog that way," and he marched right down into that dark cellar and put that dog to bed, and a little while after that, when we forgot our key, he went right in through that dark cellar and opened the door for us; going down into the cellar to put his dog to bed had taken fear of the dark out of that boy's heart as nothing else could have done and had taught him one of the grandest lessons of self sacrifice he could ever learn.

When the boy came back home to the city where had to make our living, the great question was, Shall the boy bring his dog back? We explained that he could not possibly bring the dog back to the city because the city is no place to raise dogs; a city isn't the place to raise horses or sheep, it isn't the place to raise even hogs; down there in the southern part of Philadelphia, they raise hogs, but we are driving them out; the city isn't a fit place for such things as that; for such things as that you must go out into the country where there is plenty of fresh air and blue sky and good things to eat, but we crowd our cities with little children. It's a terrible thing to treat our dumb animals that way, but all right for our children; so we told our boy that we would have to leave the dog in the country, so the boy had the great question between his love for his dog and his own selfish satisfaction in having the dog with us and he made up his mind, for the sake of the dog, to leave it in the country. Do you believe there will ever come a time in all his life when there will be any finer lesson learned? I don't believe there will ever come a time when he will have to make a harder choice between selfishness and unselfishness than when he left that dog in the country for the dog's own sake.

Believe me that the country is the place for the boy from the age of one to fifteen or sixteen, and if we will only get the school conditions right, then it will be the place for him for all his life, because a boy will naturally learn more in the country. A boy learns three things in the country that he never learns in any school, that a city boy cannot possibly learn. Whenever a city boy wants anything, do you know what he says? He says first, "Where will I buy it?" Now notice a country boy; when a country boy wants something, the first thing that he says is, "Have I got it? If I haven't got it can I make something do for it? And if I haven't got something that will answer the purpose, how can I make it?" And when the country boy has learned those three lessons, he is better equipped for life than by any other thing he can ever possibly learn in this world. He has learned to solve problems that will meet every man every where he goes. Over in Brooklyn there was a school way up almost outside of the city limits, and a country girl came down there from somewhere up in New York State. She had $60 and was going to learn how to become a special class teacher. As Miss Farrell said, "How in the world are you going to support yourself?" "Oh, this will see me through my preparation and I will get a job somewhere." So Miss Farrell didn't know what to do with this woman, and when she heard they wanted a special teacher at that school in the suburbs she sent this girl over. She expected to get a telephone message protesting, but didn't get it and a month later went over to see about it, and when she got there she began to talk to the principal about other things and after a while brought up the case of Miss Smith and said, "How is Miss Smith doing?" "Fine, fine; when she came here we turned her into an empty room with nothing but a stove, and every teacher that had a boy she couldn't do anything with turned him over to Miss Smith, and she got together a few nails, some lumber and twine and other things and had those boys get some soap boxes and go out on the dumps and get tin cans and taught them how to make wooden and tin things out of these soap boxes and cans." And do you know that country school teacher with her class, with no equipment but just a few old boxes and tin cans, because she had that country notion of doing with what you have at hand, that girl took the prize in the New York City exhibition when the classes met for the exhibition of manual training, and I say to you solemnly that the country boy has the biggest chance in the world if he will only get a father and mother that understand the country boy; if you will just let him work himself out in his environment and express some of the God-given impulses that are in him.

A boy is not bad when he is born into this world, he is good; he learns to be bad after awhile, from his association with grown up people, but when he comes into this world he is good, and if father and mother can only sit at the feet of that boy and learn something from him and at the same time throw open the world to him that he finds in the country, he will fit himself to his surroundings.

Let me stop for a moment; I don't mean that you have got to move your country schools or not send a boy to school. I don't believe that any school in any city is as fine as a country school. But what I mean is, that instead of looking upon your boy, when he begins to express somethings, instinctive things in his nature, instead of looking upon those things as degenerative, remember that those things are the finest things in him and you can educate him that way better than any other way, if we only get that attitude and understand that we, as older people, are here for the good we can do our boys, we've got the viewpoint of the situation and when we'ev got the viewpoint of the situation, our good American commonsense will help us work out this thing and we will begin to understand some of the beauties of boy nature as Whittier saw him when he said:

"Blessings on thee, little man,
Barefoot boy with cheek of tan;
With thy turned up pantaloons
And thy merry whistled tunes;
With thy red lip, redder still,
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy!
I was once a barefoot boy.

"Prince thou art—the grown up man
Only is Republican.
Let the million-dollared ride!
Barefoot, trudging at his side,
Thou hast more than he can buy,
In the reach of ear and eye,
Outward sunshine, inward joy;
Blessings on thee, barefoot boy!"

The thing that I am praying for in this land of ours is, that we shall recognize that the finest product of this country, without any exception whatsoever, the standard that we ought to erect, is the good, clean, cleared eyed, tanned country boy of America, and when we put him on the apex where he belongs, then we begin to make our country suitable and fit as a blessed habitation for the country boy, you and I, fathers and mothers, will be mighty glad to live in this land. I believe there is something marvelously true in what the great Teacher said: "Except ye become as one of these little children, ye shall not enter the Kingdom of Heaven;" and I believe devoutly that when we organize our community, when we make our country to suit our boys, we will find that lo, and behold, the Kingdom of God has come and it "covers the earth as the waters cover the sea."

The CHAIRMAN: The next topic is, "Co-operation in the Distribution and Sale of Farm Products and the Purchase of Farm Supplies," by Mr. E. B. Dorsett of Mansfield, Pa., The speaker on this subject needs no introduction to a Pennsylvania audience; he is known all over the State and has often been in our meetings. I have the pleasure of presenting to you Mr. Dorsett.

Mr. Dorsett spoke as follows:

## CO-OPERATION IN THE DISTRIBUTION AND SALE OF FARM PRODUCTS AND THE PURCHASE OF FARM SUPPLIES

By E. B. DORSETT, *Mansfield, Pa.*

Mr. Chairman, Ladies and Gentlemen: This big subject which has been assigned me, in my opinion, is one of the most important that will be discussed at this Institute. That is especially true if some real good comes out of it. We have heard so much of good concerning the farmer and the farm boy during the last two days, that I begin to feel my wild oats a little. I don't know whether you understand that or not; but I want to say, in all seriousness, that I have greatly appreciated the many things that have been said here thus far along the line of organization and co-operation, and I want to leave this thought with you farmers to carry back to your homes, that whether you believe in it or not, it is coming, it is here, and we have with us tonight as we never have had before, the people, the best people of our towns and cities; and we have with us the agricultural and the daily press, and I want to say to you that, before many more meetings of this kind have been held and passed into history, you are bound to see a change in our commercial world.

Now, we are hearing much today about the high cost of living and I shall touch upon that subject tonight only because it is closely allied to the one which has been assigned me. We shall not attempt to solve the problem, however, as that is being so ably done by men at Washington who never did anything or produced anything but financial disturbances and business depression, that a solution is not necessary. It is undoubtedly true that the high cost of living might be reduced through legislation; and it is also true that it might be made so low that it would positively be too expensive to live. It is not nearly so important that the present cost of living be reduced, as it is that the poor unfortunate who has to work for a living, should be provided with ways and means of paying for the living which he gets. Or, in other words, the ability to pay is of greater importance than the opportunity to buy cheaply.

*Tariff as a Remedy:* There are many who believe that a reduction in tariff duties would reduce the cost of living, and in this they reason logically, as it is only right to expect that, if high tariff duties tend to raise the cost of living, a reduction in those duties would produce an opposite effect.

Let us analyze the question carefully from the farmer's viewpoint. We are assembled at the county seat of one of the greatest wool producing counties in our State. How much will these farmers be benefitted and how much will the cost of living be reduced to them, if they are compelled to sell their wool in an open market and buy back woolen goods in a protected one? Some time ago the duty was removed from fertilizer materials with the avowed purpose of reducing the cost of the manufactured goods to the farmer. But instead of that the farmer is paying from $2.00 to $2.50 per ton more for his goods today than he paid before the duty was removed. To cap the climax, it is now proposed, under the bill pending, to lay a duty of some 8 or 9 cents per sack that will add another $1.60 of $1.80 per ton for the farmer to pay. When hides were placed on the free list, great care was exercised to retain the duty on leather and manufactured goods so that, instead of buying his shoes cheaper, the farmer is actually paying from $1.00 to $3.00 per pair more for his shoes today than he paid before hides were admitted free.

Tariff should no longer be considered a political question, but a business problem. It is quite time that we quit making it a football for party politics, or permitting scheming politicians to use it as a means in securing office, or in retaining those already on the payroll. Let us earnestly hope that the tariff bill may be written, not by Democrats, not by Republicans, nor by Progressives, but by a Tariff Commission composed of men with non-partisan views, having high ideals, actuated only by pure motives and with an earnest desire to perform a service that shall be for the greatest good to the greatest number. The slogan of the farmer should be, "A tariff for all or a tariff for none."

*Farmers Discriminated Against:* In much of the legislation of the past the interests of the farmer and the importance of agriculture have either been overlooked or greatly underestimated, and in the proposed tariff legislation for the future, discrimination most vicious in kind and character is being thrust upon the American farmer. He is not being consulted as to his interests, and no opportunity to appear before committees and express his views has been accorded him. Many comments are being made concerning the probable effect tariff changes will have upon trade, labor and manufacturing industries in general; and in all this, agriculture, the greatest industry of them all, is seemingly forgotten. We boast of our great railroads and our manufacturing industries, of the labor and energy that is required to keep them in operation; and yet it is nothing when compared with the labor and energy required to turn the brown soil every year in order that we may grow foodstuffs to feed our people. It is true that quite recently the farmer has been discovered, and there are some who are falling over themselves in their efforts to help the farmer help himself. To me this is both humiliating and exasperating. He is not asking for, nor is he deeply interested in "Country Life Commissions," "Rural Uplift Societies," and "Social Progress Clubs." These things are of greater usefulness to the men and women who have nothing else to do but bewail the condition of the poor, down-trodden farmer. The farmer knows that, if any real relief is obtained, it must come from within and not outside his ranks. In this, and in many other states he has an organization that looks after his social, financial and educational needs, and if present indications count for anything, it will not be long before it will wield a greater influence in shaping legislation effecting his interests. He is not asking for charity; just plain, simple justice, and a fair chance and equal opportunity to earn for himself and family an honest livelihood.

I have dwelt at some length upon this question because it has a direct bearing upon one of the main factors contained in my subject, namely, the cost of distribution. It costs the farmer of Pennsylvania from three to four dollars per ton to ship his hay to the cities of New York and Philadelphia. It costs him from six to twelve cents per bushel to ship his potatoes to the same cities, while the Canadian farmer can ship, by water, his hay for $1.50 per ton and his potatoes for two or three cents per bushel. Remove the duty of these products and the farmer can readily guess the result.

*Parties Interested:* In every co-operative movement, whether it be selling the products of the farm or purchasing farm supplies, there must be at least two parties to the transaction, namely, the producer and the consumer. If these were all, it would not be necessary to write this paper or discuss this subject. Unfortunately there has been inaugurated a system of distribution, both from the farm to the consumer and from the factory to the farm, that is pernicious and expensive, to say the least. This has been made possible by the constantly increasing number of men, better known as "middlemen," who have been coming in between the farmer and the consumer, thereby decreasing the price the farmer should receive for his products and increasing the cost to the consumer. The problem we are endeavoring to solve, therefore, becomes one of method and system rather than one that can be solved by legislation.

*Remedy:* The remedy lies in a systematic and intelligent organization of farmers. Unorganized, the farmer is helpless; organized, he becomes a powerful factor in regulating trade and commerce to and from the farm, and in enacting laws governing the same.

*The Grange a Factor:* The Grange in Pennsylvania has been a potential factor in starting the co-operative movement in this State. Its plan of operation in brief is this:—A buying and selling agency has been organized, incorporated under the laws of our State, known as the Keystone Grange Exchange. The Subordinate Granges of the State join the organization, thereby according to their members the privilege of transacting business with the Exchange. The Directors of the Exchange elect a manager, who has charge of the selling of farm products and the purchase of farm supplies. Thùs far the plan has been successful and is receiving loyal support from the members of the Exchange.

*Method of Distribution:* Each Subordinate Grange appoints an agent to look after the shipment of farm products and the purchase of farm supplies. The manager of the Exchange secures the market, and the local agent makes shipment as directed. By this method the farmer, with only a few tons of hay, or a few bushels of grain or vegetables, is permitted to join with his neighbor and ship in car lots, thereby saving from one to three dollars per ton in frieght as well as eliminating the unnecessary middleman. In time this method of shipping farm products will tend to standardize our goods. The consumer will soon learn that any product stamped with the Exchange label is a guarantee as to grade, count, weight and quality. This means that the farmer must learn new methods of handling his products. Much of the dishonesty that is charged against the farmer today is the result of his not knowing how to grade, pack and ship his products so that they will conform to market requirements, rather than any desire on his part to be tricky or dishonest. In order that this may be overcome, a campaign in teaching farmers modern methods of sorting, grading and packing their products for market will be inaugurated. A few competent men will be placed in the field to study this work under those who understand the business. Others will be sent to our market centers to study market needs and conditions. In a few years we will have an organization capable of handling our products at a minimum cost and at a greater source of profit.

*Warehouses Needed:* To make this system of distribution of farm products most efficient, warehouses with cold storage facilities will be needed in the cities of New York, Pittsburg and Philadelphia. This would enable us to so control the supply that the possibility of a "shortage" or a "glut" in the market would be reduced to a minimum. Arrangements should be made whereby a farmer would receive a warehouse receipt for any crop placed in storage, and that receipt should be considered good collateral by any bank, should he desire to make a loan up to the time the crop is sold. To my mind this is a better system of Farm Credits than has yet been advocated, as it obviates the necessity of placing a mortgage on his home or of having judgments entered against his real estate. It also permits him to sell at a time when the best prices prevail.

*Purchase of Farm Supplies:* In the purchase of farm supplies, we endeavor to purchase direct from the factory, or wahehouse, and have shipments made direct to the farm. At first we found this to be a difficult undertaking, as many manufacturers are controlled by the big jobbers, who, in turn, control the wholesale dealer, and he the local agent or dealer. The Exchange had no personal feeling or animosity against any of these fellows, yet it felt sure there were too many mouths being fed before anything reached the farmer. We made careful research in both the moral and the civil law, but could find nothing therein commanding this to be done. The nearest approach to it was the command, "That henceforth thou shalt earn thy bread by the sweat of thy face." But as this did not mention the other fellow, we decided to eliminate him. Today we are buying harvesting machinery, vehicles and farm implements of all kinds direct from the factory and shipping them direct to the farmer. By another year we will be shipping farm implements and machinery in mixed car lots, thereby making a saving to the farmer, both in price and freight. In like manner we are handling other farm supplies.

In conclusion, I desire to impress upon the farmers the importance of this movement. We have been promised many things and have been granted but few. In this movement the farmers must take a decisive stand. There is no just reason why we should be compelled to pay two or three times more than the first cost of an article to get it from the factory to the farm. The railroads cannot honestly be charged with the high cost of distribution. Undoubtedly their rates in many cases are excessive, but even at that only 8 per cent. of the 70 that is lost between the farmer and the consumer is received by the railroad companies. Farmers, this is our problem. Let us go back to our several homes with a firm resolve and fixed determination to battle for our rights, our homes and a permanent agriculture.

The CHAIRMAN: Next, will be an address on "Alfalfa," by Professor F. R. Stevens.

Prof. Steven's address is as follows:

## ALFALFA

By PROF. F. R. STEVENS

Mr. Chairman and Friends: This is a subject that has been taken up in perhaps nine out of every ten agricultural meetings during the past six or eight years. It is a subject upon which much has been said and written, and yet a great deal of misconception exists both as to its culture and use. One of the most valuable and oldest of forage crops, with a history beginning in the early Egyptian periods, it has followed those soils naturally adapted to its culture until it has spread in spots well over Europe and Asia. Coming to us from the Pacific Coast it followed the same course over limestone soils until its wonderful value as a forage crop urged our scientific men to devise culture by which it might be grown on a higher range of soils. In this, as in most that they undertake, they have been successful and it may now be grown on all deep and well drained soils. We have also encouraging evidence that our seed selectors and seed breeders are adapting varieties to the shallow and hard pan land. Any deep soil that is well drained to the depth of three and one-half to four feet may be depended upon to grow a profitable crop of alfalfa. The type is not material although a light sand will produce least profitable results. It should be seeded on corn or other broken ground or on a field which has been in meadow not over one year. The humus content should be high, stable manure or field peas turned under seem to give the best results.

Lime is necessary in non-limestone soils, one and one-half tons of burned lime or its equivalent, three tons of ground limestone should be used per acre spread on top after the vegetable matter is plowed under. In limestone soils this amount may be reduced but there are few soils where an application of some lime is not needed. Phosphorus seems to be needed in all soils of the State for best results with alfalfa; at least three hundred pounds of acid phosphate or its equivalent in bone or basic slag. In light soils potash is needed. The proper bacteria must be present in the soil. In non-limestone soils where alfalfa has not been grown before, artificial inoculation of the soil is essential. In limestone soils many fields need inoculation, while others seem to contain the bacteria and inoculation does not help. Unless one is absolutely sure that the bacteria exists, the field should be inoculated. This may be easily and effectively done with the cultures, provided they are intelligently and carefully used. The soil transfer method involves considerable labor, but is very reliable and cheap. Twenty pounds of seed is sufficient and in order to get best distribution, should be seeded with a wheel-barrow seeder, set at ten pounds per acre and going both ways.

There are two seasons for seeding, late May or early June and August. In limestone sections, some excellent stands have been obtained by seeding with wheat or barley. As a rule, however, better results are obtained by seeding alone. In case of late Fall seeding a bushel of oats has helped materially in forming a growth to hold the snow during the Winter and prevent freezing out.

When alfalfa is properly seeded three crops may be reasonably expected the year following, the seeding giving a yield of from three to five tons per acre per year. Under particularly favorable circumstances higher yields that this have been averaged over considerable areas.

The curing problem is no worse than that of heavy clover. There has been a tendency in the East to leave the first cutting of alfalfa too late. The first blossom, or the first new shoot from the root is an indication of the time to begin cutting. This usually occurs during the late warm spell in May which we designate as Corn Planting Season. A tedder should be used immediately behind the mower and if the contour of the ground will permit, a side delivery rake does very effective work. Two windows thrown together will under favorable weather conditions permit sufficient curing so that it may be drawn directly from the windows. However, we Eastern farmers should provide ourselves with sufficient cock caps to insure good protection in unfavorable weather. Cock caps sufficient for one-third the crop is sufficient. The hay sled device in common use in the west seems to be naturally adapted to our Eastern conditions. This device consists of two long runners arranged like a stone boat with a hay rake over which one sling is placed. One man takes this rake fills the rack as high as possible and drives directly to the stack, using his own team to work the horse fork. In case of a short haul more hay may be taken to the stack than in our usual form.

Much has been said about the value of alfalfa, and the truth has rarely been exaggerated. Its deep tap root breaks up the subsoils and adds more humus than perhaps any other plant. As a soiling crop it cannot be excelled because it grows continuously during the season and provides a succulent food for the entire growing year. Its feeding value is usually high. The United States Department of Agriculture quotes it as worth on an average of $20.16 per ton as against clover hay at $14.12, timothy hay at $9.80 and wheat bran at $22.80 and giving it an exact value with shelled corn. Our personal experience in the East have confirmed these valuues.

It has proved an excellent feed for horses where used intelligently. Some two years ago I tried an experiment on one hundred mules fed with one-half alfalfa and one-half timothy hay and one-half a grain ration which was fed to another one hundred mules fed similarly, except the alfalfa hay, and those mules which were fed alfalfa did more work and came through the experiment in much better shape than those not fed alfalfa, while a saving of feed of 25 per cent. was effected. For young stock it builds a strong bone as well as develops the animal rapidly. In experiments along our line in feeding to the dairy cow, there is repeated testimony that when alfalfa is substituted in part for other hay that the milk flow is materially increased. It does not seem advisable at present to pasture alfalfa except with hens and hogs, but for those it proves a most excellent pasture. In the West it is customary to average ten hogs for each acre, feeding addition about one pound of grain per hog per day. It is an excellent pasture for poultry or bees.

Alfalfa has done more than any other one thing to accentuate the value of limestone soils for agricultural purposes. The spread of this crop on land where it has been grown is very rapid and will be still more rapid in the near future. Undoubtedly, the use of lime has materially widened the area in which alfalfa may be grown, but there is still a large area of our country where the soil is too thin to grow. as we now know it. The efforts of agricultural scientists and extension workers of the future will be largely directed toward adapting a variety of alfalfa to the hardpan soils where it cannot now be grown. In our efforts to do this we have much encouragement. Many varieties have appeared probably by accident, from the old world heretofore unknown in this country which has characteristics that seem to fit it for this hardpan land. Among these, perhaps the most promising, is the Grimm which has developed a tendency to bud just beneath the surface of the ground instead of at the top of the crown. This tendency allows it to make a spreading root as well as the tap roots, which serves to hold it in the ground during the freezing and thawing seasons which has in the past killed the alfalfa in the wet, hardpan soils.

Our railroad has, during the past year, contributed to a considerable number of farmers a small amount of this seed for trial and for the purpose of growing seed at various points along the line for distribution around these centers. The Baltic, Old Greeley and Variegated seed have somewhat the same characteristics. They have been called to our attention because of the fact that they have held the ground throughout the Winters that have killed the ordinary varieties. There are some faults to these new varieties, such as a tendency to lodge easily. But this will have to be overcome by seed selection.

Alfalfa is bound to become one of the two or three most important forage crops of the East. It should, however, be kept in its place. Some of its over enthusiastic friends have substituted it for clover in short rotations. Alfalfa cannot, in short rotations, develop as much root or top as the red clovers. It does, however, fit better into a long rotation than the red clovers because when it once becomes settled it will pulverize the sub-soil and its final effect will be much more beneficial than red clover.

Its main value lies, therefore, first, in long rotations where it may be kept down for four or five years. Second, as a farming crop which may be harvested year after year. Third, as a pasture for hogs, bees, etc., to which it is adapted in its present form, and we hope later to extend this to horses and cattle by the adoption of a new form to which I have referred. It is a crop that has been of wonderful value to agriculture up to the present time, but its extension and adoption has only begun and we look for even greater benefits in the future than we have in the past.

We know now what we can do. The yield of alfalfa is something about which I hardly dare talk, we hear such extravagent stories, few of which are badly exaggerated. I will begin at some of the largest. I have known actually of nine tons of alfalfa being taken off of an acre. Further explanation is due—that field was specially prepared and top dressed several times with nitrate of soda and water was applied as it should be.

A Member: Was that grown in the East?

PROF. STEVENS: That was grown about three miles from Syracuse; four cuttings. Over a considerable area, I have known alfalfa to average 5.22 tons per acre of well dried hay, actually weighed. We have along the line of a railroad with which I am connected, two farms, each of which has 200 acres in alfalfa, and they have averaged 3 1-2 to 3.75 tons per acre over the entire acreage. That was three cuttings. May I say right there that occasionally we can, here in this State and the neighboring states north, get four cuttings, but the average is a little over three; and in the majority of cases we get three.

A Member: Do you think that can be done and do justice to the continued life of the crop—take more than three cuttings?

PROF. STEVENS: In general, no; occasionally, yes. May I follow up that thought? We are apt to leave the first cutting a little too late in this section; that is, it becomes too woody and too large. If we cut it a little bit earlier, the moment you can see the first signs of life in the new buds at the top of the root, and that will come when the first of the buds are forming at the top and comes in late corn planting seasons; in normal seasons—this is not normal, it is too dry—if we take that cutting at that time, to give the second crop, the benefit of the rains likely to follow, we are likely to get four good crops and the quality of each will be better than if we left the first crop till it came to maturity.

A Member: How much of that land was two or three-year old plants Does it yield as great after the second year?

PROF. STEVENS: Yes, the field that averaged 5.22 to the acre, that was last year, 1912 was the second year that it had been cut. It was seeded in April 1910 and it yielded 5.22 tons to the acre in 1912 and bids fair to come up to that record this year.

A Member: I have had records as good as that the first year and also the second year, but never got it the third or fourth year; I don't seem able to hold it.

PROF. STEVENS: What is the type of soil?

A Member: Clay.

PROF. STEVENS: Is it well drained, deep?

A Member: Yes, fairly.

PROF. STEVENS: It's subsoil drainage I have in mind. The field yielding 5.22 tons per acre was tile drained over the entire field.

MR. SEEDS: In my State, at the present time, I am employing the best methods in a field fourteen years old, in Pennsylvania, and the longer it continues, the less it produces; you don't get as many tons, the older the field is.

PROF. STEVENS: I thought you were trying to get ahead of the story I told about that field seeded in 1849; I thought perhaps you had changed that statement. Couldn't you stretch that over fifteen years, some, Brother Seeds?

MR. SEEDS: How much does that yield per acre now—seeded in 1849?

PROF. STEVENS: It is practically gone, but there are stalks all over the field from the same seeding.

MR. SEEDS: How long is it practicable to keep ground in alfalfa, in your experience?

PROF. STEVENS: Twelve to fifteen years. We have that data gathered from Onondaga county, New York, where it has been a general crop for 20 to 25 years.

MR. SEEDS: In cutting alfalfa, do you cut it one, two or three inches from the ground?

PROF. STEVENS: Don't cut it too high, there is no object in it. I'll split the difference there.

Now, one word regarding curing; the curing problem is the one thing that has been brought up as a stumbling block more than anything else. It should be treated, of course, the same as clover hay. If a tedder is used, it should be used directly behind the mowing machine, or you will lose a good many leaves. A side delivery rake is one of the very best tools for gathering alfalfa, because under good curing conditions, where you can throw too windows together, you can cure it there without the necessary cutting, and that is what shakes off a great many of the leaves, but you have to have very favorable curing conditions to do that; if not, you should provide yourselves with cock caps sufficient to cover one-third the area you have in alfalfa, and use them, because the constant shaking out of the alfalfa to dry it out is very detrimental to it.

A Member: What methods would you use for curing the third crop in alfalfa, of 1911 and 1912?

PROF. STEVENS: Well, a great deal was spoiled, as far as the color goes, there's no question about that. `In the dairy districts, in a great many sections, the farmers keep up the silos and cutting machines, and whenever a crop is badly wet, they run it through the cutting machine and put it in the silo, the same as they do with clover hay. Others have used the cock caps where they have no silos, except where it has to remain on the ground several days, then it is best to take a fork and pull it from one place to another, else it will kill out the roots underneath.

A Member: When is the most favorable time for planting alfalfa?

PROF. STEVENS: Twice a year, May or August. Don't plant it in the mid-summer months; dodge the latter part of June or July.

A Member: The best result I ever got was from a stand seeded the 26th day of June.

PROF. STEVENS: Well, you happened to have favorable rains. We usually get a drought in August, it's a little too hot for it to start at that time. If, preceding that drought, you can get its roots down into the ground, it will hold during the drought. Again, if put in August, it has a show.

A Member: I have arrived at the conclusion that August is the best for our locality.

PROF. STEVENS: Many sections report August seeding most successful. While I am on that subject, I want to say a word or two regarding the harvesting. Some few years ago I went throught the West to study this condition, there of course they haven't the rains, in the Far West. Through Western Nebraska they can depend upon their rains more than we can here, knowing about when they will come, but I found methods of harvesting there that were more successful than ours. There is a stacking problem here; the alfalfa should be put near the barns, other things being equal, on account, first, of the large haul, and then this point which I bring up. On the ranches they did not use wagons for hauling, they used "stone bolts," arranged two, poles—I presume we would use two by fours; they had stripped off the mountain saplings about the size of a hay rack across—it was a little rack, just a stone bolt arrangement, and they would hitch a team to that and one man would take it and go along the side of a double row and load it as high as he could and take it in, then unhitch his team and go back and bring in another boat, so one man worked a team and a stone boat and there was nobody in the field pitching on it. It seemed to be an arrangement which could, under favorable conditions, be worked here, although if the haul was long or over rough ground, it would not work.

A Member: How long was the test you have spoken of carried forward?

PROF. STEVENS: Something like three to four months.

A Member: You said alfalfa could be fed to horses if fed intelligently; what do you mean by that?

PROF. STEVENS: In Pennsylvania, if a man is feeding on a grain basis, instead of timothy hay basis, alfalfa, with its immense protein content, if fed to excess, will throw burdens on the kidneys that they cannot carry, and so you will see a disturbance in the kidneys as well as the bloating effect, if fed in excess.

A Member: You don't mean the hay?

PROF. STEVENS: Yes, I mean the hay, if fed to excess, will throw burdens upon the kidneys. Its comparison is with wheat bran instead of timothy hay, and so, in starting, it must be used with considerable care.

A Member: Did you ever find any difference in the quality of feed in different sections of the United States?

PROF. STEVENS: Yes, I'm coming to that. Experiments in feeding to dairy cows have shown that when alfalfa is substituted in part for other hay, the milk flow is considerably increased. I have no doubt but what, in the near future, we will develop by selection types of alfalfa which has a spreading root, which will hold upon the hardpan lands of which we have so large an area in this State and in southern New York.

A Member: Well, in plowing up your home plots that you seeded a number of years ago, don't you find that conditions at the present time?

PROF. STEVENS: You will occasionally find a plant standing, and where you do, you will find that it has a spreading root.

A Member: But in plowing up an entire plot, when you have occasion to pull one of them up, haven't you found that many of those strong and extending roots are devoid of the full edged tap root system?

PROF. STEVENS: Occasionally you will find that type of root.

A Member: I have a plot now seeded in potatoes that stood for five years that I would like to have you see. I think it evidently represents the type of root we are hunting for.

PROF. STEVENS: I hope that a great deal will be done by our extension department in this line. Along the line of our road, a great deal of seed has been distributed.

A Member: In the alfalfa matter, a man having a desire to successfully seed in alfalfa—take a series of years—have you had serious trouble with the fox tail or native grasses crowding out the seeding.

PROF. STEVENS: Fox tail seems to bother more than any other kind. The best treatment I know of is, after the first cutting, to go over it with a spring tooth harrow; it is better that it be taken to a blacksmith shop and pointed before using.

A Member: You are all right, I've done that repeatedly; I have used a brand new harrow.

PROF. STEVENS: But the pointed tips are better still.

A Member: Have you ever experienced any trouble with your alfalfa roots growing over a tile drain.

PROF. STEVENS: Only on one condition, where it comes from a living spring; then the alfalfa roots will tap it. Where it is dry, the roots will not tap it.

A Member: Have you any knowledge of inoculating material?

PROF. STEVENS: Yes, there are several cultures that are reliable. The greatest difficulty is that they have not been properly used. Practically all are reliable—those on the market now. I think that if land had been limed before, it would not have to be limed again.

PROF. MENGES: The Committee on Resolutions would like to have any resolutions that anyone desires to be presented here. You can hand them to Dr. Conard, Mr. Schultz or myself. I wish you would attend to that this evening or to-morrow morning. Any resolution you would like to be presented at this meeting, please hand them to one of the men named.

The CHAIRMAN: Next is an illustrated lecture by Mr. H. B. Fullerton, Director Agricultural Development, Milford, Long Island, on the subject, "Best Agricultural Opportunities are in the East."

Mr. Fullerton spoke as follows:

## BEST AGRICULTURAL OPPORTUNITIES ARE IN THE EAST

By H. B. FULLERTON, *Director Agricultural Development, Long Island Railroad Company, Milford, Long Island.*

(Address illustrated with stereopticon slides.)

Neighbors: Horace Greeley, years ago, advised young men to go West, and the Sage of Chapaqua was a very wise man. If he had lived today, he would use his well-known powers of persuasion to coax American youth to stay East, and also bring the soil tilling youth of Europe to our Eastern States in order to assure adequate food supply for our now underfed Eastern cities. Our great country has outgrown itself in many ways. The most remarkable, most important and by long odds the most interesting item to each and every American, no matter what his standing in life may be, is the existence of very perplexing and vastly injurious state of affairs which, at the present time, is working, readily rectifiable hardships to the consumer in particular.

The title given my address is up to the present time merely a statement, and statements are of little value indeed in this day and generation; therefore, with the aid of a goodly number of self-taken photographs, many of them colored by my very willing and extremely efficient life partner, I aim to prove to the most skeptical mind present that the statement is fully warranted by facts.

America, possessing, as it does, the finest, most highly developed method of transportation now before you in the shape of an American limited express, has made it possible to bring from far distant regions food supplies, many of which should be, for manifold reasons, raised on the idle acres, of which millions lie close to the great markets of the East. This picture, for example, is a sample of 270.000 acres that, in 1905, existed from thirty to sixty miles from that greatest of all markets, New York City. Practically all of it had been in the market for generations at a price of from one to six dollars an acre, with no takers, Long Islanders, for two hundred and sixty odd years had said it was valueless, and this unbiased statement had been strangely enough reiterated by scientists and experts of State and National repute.

Strangely enough Nature's refutation of off-hand statements and deeply learned argument had been persistently over-looked or set aside, for the remarkably close and vigorous growth now before you is that of a single year; sprout oaks of every description, huckleberries, sweet fern and numerous other shrubs shown above, annually, for 150 years had been burned to the ground. Sprout oak growth from the stumps of once existing monarchs does not make from five to seven feet growth in a season, except under particularly favorable conditions of soil and climate. And it was this self- evident fact that caused President Ralph Peters of the Long Island Railroad and those to whom he entrusted the work, to tackle what they alone considered an easy job, that of definitely proving that Nature was right and man-made tradition and man-evolved theory were absolutely baseless.

Our method of procedure was extremely simple and economical as well and again reliance implicit was placed on Nature's teaching. This rock and varying plant growth upon and about it illustrates exactly the fundamental principles of successful plant growing, illustrating as it does the history of the world. From the rock came the mineral elements which make up our soils; through the action of wind and water, heat and cold, its particles were distributed. Lichens, with which this rock is covered, represent the lowest form of vegetable life, eaking out a bare existence from air and water, with trifling aid from the hard substance to which it clings, dying or torn from its foot-hold, it fell and lodged in a crevice or split of the rock, and with this slight addition or organic life a higher form of plant growth appeared, yet a rather insignificant form of fern, which, when its life was over, fell to the base of the rock and furnishing more abundant vegetable matter to decay made possible a still higher and better form of plant growth, which, in its turn, as eons rolled on, enabled Nature to produce that highest form of plant growth, the stately tree.

Knowing that Nature was the best of all teachers, we unhesitatingly followed her methods. As Nature had plainly indicated, we found three feet of soil where man-made theories had proclaimed a depth of half an inch. It being shown that the rocks had been thus liberal with the mineral elements, we looked for signs of vegetable matter. It was totally lacking; at least upon the surface, for the annual forest fires had destroyed the falling leaves and dying annually as fast as they had been dropped upon the soil. To supply this lack in time for the coming season's growth, stable manure only could be used, for it was September 7, 1901, when the work was started, and while knowing full well that from twenty-five to sixty tons of stable manure was used by successful growers, we felt that we must confine ourselves to the least possible quantity. Deciding that ten tons of stable manure would furnish sufficient organic matter to insure our first crop, which was rye, we purchased this at 95 cents a ton, delivered, which included, of course, the freight charges. In thirty days, by the use of that quick acting persuader, dynamite, we cleared, plowed, harrowed and drilled in a crop of rye and soon had the inexpressible satisfaction of having Nature prove by a lusty growth that she was right.

Because of the always existing lack of fresh food supply in New York City and Brooklyn, the ten acres were laid out during the winter for market gardening on the intensive plan so common in Europe, so little followed in our own country, although it is recognized as yielding the highest returns per acre of any other soil-tilling plan. From the beginning of our work we had determined to keep up the income throughout the year, and not to follow the common method of income for a few weeks and outgo for the balance of the year. Our first crop was sea-kale, more impetuous than even asparagus, with us lifting great slabs of frozen earth in order to get its delicate light green leaves and glistening white stalks into the open air.

A double-barreled food is this, furnishing the much craved greens and stalks for stewing and creaming. Asparagus follows closely, and is a big income producer. Rhubarb, by a little coaxing, using discarded nail kegs, half barrels or boxes with the bottoms knocked out, make cheap and wonderfully effective forcing houses, furnishing long, thick, juicy stalks weeks before the crop can be gathered from plants left exposed to the early spring cold nights. Early tomatoes were decided on to be the intercrop of the acre planted to fruit trees. Observation has taught us that tomatoes set out from rows or even where transplanted showed marked objection to disturbance and did little until all root injury had been repaired. We felt that transplanting into earthen pots or wooden boxes would not insure against this injury, and selected the hard-pressed smooth surface paste-board pots manufactured in the Bay State. A most fortunate selection this proved, for we gained just three weeks over transplants made in accordance with common usage. By packing selected fruits in "four-quart" boxes we obtained for a crate containing less than 24 quarts $1.50, when neighbors, shipping in bushel crates were getting returns of 8 cents a bushel which at that time meant a loss of 4 cents on the crate alone. Besides raising all the regular varieties of plant food we sought far afield for the favorite food of other countries.

In this quest we were ably assisted by David Fairchild, head of the United States Bureau of Plant Distribution, and later, by many other unknown Nature-loving friends throughout the world. We found a most beautiful delicate and eminently satisfactory cabbage, particularly suited to the making of cold-slaw of superlative quality. We found a member of the cabbage family superior to the majority of plants obtained from the sowing of the early Jersey Wakefield. A member of the flat Dutch family, as this picture shows, the regulation wheel-barrow fully occupied by a single head demonstrates its value most persuasively. Every head in a field of this "Allhead" strain is cut before the side-by-side field of Early Jersey can be entirely cropped. Endive, so frequently called escarolle, is grown with ease, as these baskets of handsome, well-blanched specimens attest. The simplest form of blanching we discovered is the use of salt hay or even a loose covering of rye straw. The French, or Globe artichoke, an epicurean delicacy, now largely supplied by Belgium, offers a most attractive method of income production. This big thistle, cut just before the bud opens, blooms a second year. It is not tender and winters with ease except in an open-winter country like our own, where snowfall melts and night freeze may all come within 24 hours. To protect the crown against injury we find that a couple of oak branches or any other roughly constructed pyramid is ample.

In the great Sakuragima radish of the Japanese we found a worthy vegetable amply repaying the most distinguished consideration. It is a winter radish and it should be planted late. In flavor it rivals the French breakfast. In size it is a giant, reaching with us the maximum of 42 pounds. In texture it resembles the apple; its great leaves frequently reach a length of 4 feet and furnish greens as well as stalk for stew. Its flesh can be eaten raw or sliced and cooked like turnips. It winters splendidly, and appeals to practically all tests. Cauliflower, a vegetable known to but few, and held at prices making it a luxury, thrives best when close to the benign influence of salt water. With such condition Long Island is particularly blessed, but New England has ample shore line which, for those willing to give the special care of cultivation and blanching of the head, will secure ample returns. The Giant Gibralter onion, the best strain we have been able to obtain, of the famous Bermuda onions, ancestors is grown as easily and as cheaply as the rank R of Weathersfield, and brings the highest price of any onion on the market. Two and three pounders are very common and needless to say command a most attractive price. Whitloof Chicory, called "endive" by Americans, serves well to keep up the income through the coldest of our months. Grown in the open to secure the largest roots possible its leaves are cut off in the fall and roots set in normal position in the sand floor of cellar or roof shed. With but slight attention beyond the cutting we have secured five crops during the winter.

Good berries are rare. Indeed, for ability to stand long distance shipping, is the sole quality sought by raisers. Here you see two representatives in their peculiar classes. The Heritage, an immense mis-shapen monstrosity, brilliant in color with a wealth of calyx, but merely medium in quality, while the Conical Chesapeake is the finest in quality of any strain we have so far discovered. Strawberries, no matter what their variety, should be attractively packed and none but first-class specimens permitted to leave the farm. A trade mark, backed by such business procedure, will quickly work up a lucrative trade. The raspberry is one of the extremely good things that has almost been forgotten. Even the red one, the most commonly raised, is supplied in quantities far below the demand. The black, almost unknown in the East, quickly becomes a favorite wherever it is used. The yellow is extremely rare and its acid tendency is against it, except as a contrast and combination for serving with the other varieties. We find Cuthbert the leader of the red in quality, and the Cumberland of the blacks, and Golden Queen is the finest yellow we have discovered.

Fallow indeed is the field for cantaloupe growing. The bulk of the supply now travels great distances and is of a variety mainly noted because of its ability to ripen after being picked from the vine. Both the Fordhook and Burrell gem are far superior and the nearby grocer would quickly control the market. The family Giant, called the Montreal, is of value only because of the size, but one strain, the Mount Royal, being sweet or of good flavor. Canada practically controls this $36 a dozen brand of melon, yet it can be grown with ease in the Eastern states. The varieties of watermelon shown are the Kentucky Sweet and its near relative the Halbert Honey. Tom Watson, a late introduction, proves all around superior to even these. This group of Long Island fruit proves beyond any question that the East need not step out of its own territory for the finest apples, standard or crab, the most lucious of pears or plumb, the ideal quince, superb grapes or the out-of-season fall strawberry.

The planting of fruit trees offers today as always a magnificent opportunity. To say that it will be overdone is simply silly. Statistics show for example that of the thousand of fruit trees set out by land developers, etc., less than 5 per cent. survive at the present time, and the bulk of these will never be handled in a way to cause the slightest effect on the fruit market. Many hold back from orchard planting because, as frequently stated, it requires a life time to secure income from them.

The following pictures, illustrating the Japanese plum tree's history, certainly refutes this statement. Here an 18 months girlie is assisting the planting of a whip-like tree. Two years later we find her sitting in its shade with here and there a ripened plum above her. The following year it is heavily laden as the illustration proves. Japanese plums are close to the ideal, as we find on examining the contour, the rich color of the flesh and the delightful luscious flavor. So, whether it be that superb eating specimen the Ekuri, the heavy bearing Botan, or the marvelous preserver the Satsuma, we find an ideal quick income yielder for use as fillers in the apple orchard. And this small boy shows us another excellent filler the peach. This particular variety being the Greensboro, a hardy, extreme early very prolific, high quality kind. The hand cider press suggests another way of filling the unfilled longing for real cider, made without calling in the experts of the chemical laboratory.

It seems that the days of the sweet American chestnut are limited, and like many other of Nature's creatures it is to become a thing of the past. In seeking for a nut to replace it since I endeavored to check the fatal blight with Bordeaux in 1906, the most promising variety is the one shown here, the Japanese walnut. It combines the good points and leaves out the bad of both our American black walnut and the butternut. A beautiful member of the cow family opens up the many channels of income production, butter and cream and milk, for their demand must ever increase each year more rapidly is but inadeqůately supplied today; really good butter is today but rarely found even at exorbitant figures. Cream is but for the fortune favored and milk in scant supply. Besides all this the cow in days gone by aided greatly in keeping up the fertility of the farm and the waste from the stable combined with such crops as the legume here shown, crimson clover, will bring every Eastern acre into annual production far exceeding anything known in the past. Alfalfa, another wonderful soil up-builder, whose wonderful versatility has been known for ages. Besides gathering and storing away in the ground the nitrogen of the air, yields on Long Island from 5 to 6¼ tons annually, furnishing three cuttings always and sometimes four, changing the color of butter from white to yellow, frequently within 36 hours, increasing the milk supply always, producing pork so fine in texture and so sweet as to yield a return of 2 cents above the corn fed article. A notable inciter of poultry to egg production, and even as a flower a thing of beauty and a joy forever.

This hardy long lived plant presents, then, great opportunity for Eastern soil tillers. The newly finished barn built for the production of pure milk shows that uncompleted dairyman's friend, the silo being filled by power supplied from the hub of a Western high-wheeled motor wagon, one the cheapest sources of mechanical power we have discovered, able to carry a ton's load over country roads, fill a silo or draw crops from the field. The simple milkhouse with running water drawn from the tank supplying the farm, which, coming from a driven well only 68 feet deep, is handled much, as were the old spring houses, the water coming from below hardpan arrives at the surface at a temperature of 49 degrees, and even on the hottest summer days holds our milk at a temperature of close to 60 degrees. In this little house was made the butter that in State-wide competition scored 99½ points, the highest ever obtained and this by my life partner, a butter maker of but two years' standing. Her butter in competition with the Nation's butter makers at Chicago in the same year, 1912, brought her another medal. For feed and for filling of the silo, corn is still King, and the varieties from which to select are many, from the small-eared, light-yielding, very hard flint, of main value because best suited for grinding into corn meal, through numerous semi-dents to the dent, the biggest yielder and most suitable of all varieties for animal food.

As the proof of the corn is in the shelling, I place before you the relative merits graphically illustrated. Here the biggest cob gave the greatest yield of shelled corn. This particular strain was the Eureka, available for Eastern growers. All good men and true know full well that the one thing most necessary to a farm's success is the home, and its manager, whose work is never done, and this home, be it ever so humble, should receive far more attention than is bestowed by the average man. Every possible attention and care should be given to keep it beautiful, bright and cheery. Money should be feely spent, if necessary for vines, for shrubs and for flowers. As a matter of fact small indeed is the outlay of money necessary and great indeed is the happiness to be secured. To woman-nature and that of most men, flowers mean much, and flowers also are a source of splendid income. Pansy plants grown for city dwellers supply a large part of many a family's income. The sweet pea, most prolific, and bearing throughout a long season when its roots are protected by mulch, pays big dividends. Fifty-five hundred blossoms were picked per day from the small patch shown, and arranged as women alone can arrange flowers, find a ready market. In the center of this bunch of beauties is a Fourth of July bunching, red, white and blue. A few moment's more time spent trebles the value on Independence Day. In the foreground you see the variety with yellow tint, to gain which Eckford, the famous English sweet pear raiser, devoted his entire life. This easily raised purple aster supports on four and a half acres an Armenian and his large family. Yet to many such a crop would seem picayune indeed. Yet numerous hardy other varieties, which would do the same, or far better. The chrysanthemum, the cone flower, daisies, violets, and many varieties of the sun-flower family.

Eggs present boundless opportunities at present, the supply being most erratic and coming from sources far afield subjected to speculative manipulation and masquerading months and years later under wierd designations in which the word fresh is erroneously placed. The parcels post helped some, but adds, under the present crude and high priced stage, almost a cent apiece in taxation upon the consumer. This group of vegetables and fruits, raised upon the idle acres shown you at the beginning of the address, by adding $9.50 worth of stable manure and 800 pounds of lime, aided in bringing back to Long Island from New York's State Fair 117 prizes, and in competition, locally and in other states, proved conclusively that the acres lying idle on Long Island are not only extremely fertile, but capable of producing big crops of the highest class of plant-food life, and beyond this, because of their close proximity to the consumer, need fear no competition from far-distant belts of any description.

The developments of the last few years has demonstrated to us most clearly that those American monarchs dubbed "peach kings" "onion kings" "alfalfa kings" etc., are giving way rapidly to the reign of queens. It was a woman that lead in apples; it is a woman that stands supreme as a market gardener, and it was a woman whose strawberry plantation led all the rest in the year gone by. The unpleasant rotund over-headed individual who holds between his feet the market built by the people for the people, is the portrayal of cartoonist Harding of the Brooklyn Eagle of the five to seven unnecessary speculators amassing unearned wealth by the utilization of capital belonging to the producer and the consumer.

To the producer he hands a minature bag of pennies, in exchange for a liberal hamper of garden truck, while with the other hand he disburses to the consumer a basket of trifling size demanding therefore a mammoth sack of dollars. Like other things unnecessary to human welfare concerted effort of the two classes comprising the majority of these United States will quickly and most effectively wipe the food speculator out of existence. When we strike a snag we root it out. When we strike a stone wall, we go over it.

The Long Island Home Hamper herewith portrayed clearly demonstrates how we as producers landed directly in the kitchen of America's biggest city of consumers. This package, developed in 1906, has already built up a national reputation and place for itself, for it is a common-sense method of solving the very serious problem confronting both producers and consumers. For it we receive one dolar and a half, cash. It comes under the perishable matter express rate and is taken by the express company from the farm station to the city consumer's dwelling, for twenty-five cents. It is under the specified minimum, weighing on the average 33 pounds. It consists of 6 four-quart boxes, with a wooden separator between the two tiers of each three, and a cover made fast by the regulation crate-fastener. In small quantites the crate, which is the Georgia carrier, with 6 four-quart boxes, the separator and the cover, costs 18 to 18½ cents. The paper used to cover the contents of each four-quart box; the label on the cover, substracted, with the express charge, from the gross, $1.50, leaves us 98 cents for the hamper. In making shipment of similar items in bulk through the city speculators we found that 6 cents was the average received for the contents of the hamper, thus the producing end gained just 92 cents by using the Long Island Home Hamper. Consumers tell us that the contents of the hamper they find can be duplicated for from $2.20 up to $4.50, thus while saving the producer 92 cents we are saving the consumer from 70 cents to $3.00. Needless to say, the Home Hamper is not patented and it gives me great joy to announce that many who have adopted it in various sections of the United States are not only gaining but giving happiness as well. Another illustration of the Home Hamper, showing the fillers from which we draw late in the season. Tomatoes of course being pulled up from the field before frost catches them and stored in a shed in the old-fashioned way.

The public market, completed in many places throughout the country, under way in others, and being fought for in still others, is another solution of the problem, but only when dedicated to the public for the public, and only producers on their local and fully authorized agents are permitted a floorhold or stall therein. The market shown is one to be erected at Long Island City, New York, equipped with the ice-plant for cold-storage purposes, and as you see, so situated that no monopoly of transportation is possible. as it is reached by even sea-going vessels, by trolley, by team, and by railroad. Of all the manifold advantages of earning a livelihood in the country, none surpass the family life only possible to open air income earners. Here alone can the father have the ideal companionship of his life partner. Here alone can he grow up with his children and really and truly know them, and further the soil-tiller's life is the only one where the whole family can work in partnership. For these and the many other reasons called to your attention everyday is Thanksgiving on the farm and the pumpkin pie, that symbol of American thankfulness, can be deep in filling and liberal in size. Add to the Golden Rule this following verse, by Amoretta Fitch:

"Now I get me up to work,
And pray the Lord I may not shirk;
If I should die before the night,
I pray the Lord my work's all right:"

And I do not have the slightest hesitation in guaranteeing that each and everyone of this audience who really loves Nature and her work will acknowledge that the title of this address was fully justified and may they find in the proofs presented helpful suggestions for their own world's work.

The meeting then adjourned until Thursday, May 22, 9.30 A. M.

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Washington, Pa., May 22, 9.30 A. M.

Hon. A. L. MARTIN, Chairman.

The CHAIRMAN: Before opening the Institute proper, I may say that we are in receipt of a number of letters from County Chairmen of Institutes and lecturers, who, by reason of sickness and other unavoidable causes, have been prevented from attending. A very interesting letter from a gentleman with whom we are also associated, Hon. Thomas J. Philips, of Atglen, Chester county, has been received. He writes that, "While I am steadily growing stronger, eat and sleep well, I walk out every day, I hardly think it prudent to attempt to travel so far as Washington, Pa. I regret this, would enjoy meeting all my old friends, hope you will have a pleasant and profitable meeting." Mr. Philips has been afflicted and has been in in the hospital for some two or three months, but is recovering. We are also in receipt of a letter from another of our familiar workers, not only one with whom you are well acquainted, but one of the eminent writers for the National Stockman and Farmer, L. W. Lighty, who states that on account of sickness of Mrs. Lighty, who seems to be lying close to death's door, he is prevented from meeting with us and sends his kind regards to all. We also have a letter from Mr. Warburton, of Sullivan county, stating that on account of an unexpected call, he is prevented from attending. We have still another letter from Washington, D. C., Prof. Welles W. Cook, who has traveled all over Pennsylvania in attendance at our Institutes and schools, saying that on account of official work in the Department with which he is associated, he is prevented from attending and sends his cordial regards.

We are expecting, and, as you will see by the program, have announced this froenoon as the "Good Roads Session." You will further see that placed on this program is the Governor, our Senior United States Senator, Hon. Boies Penrose, Senator Bourne, of Oregon, the State Highway Commissioner and others, and the "Dirt Road" advocate, Hon. Edward E. Jones, of Susquehanna county. We have information that this delegation is expected to be in the city a little after ten o'clock. Now, until that hour arrives, we will take up that part of our program relating to Farmers' Institute management. You know that is a thing we can cut off most anywhere and we will proceed with same until the delegation arrives.

Before entering upon this work, I may say, incidentally, that the past year was, in some respects, a phenomenal one in Farmers' Institute work. This work was carried on, and meetings were held in every county in the State on the meager sum of twenty thousand dollars, twenty-two thousand five hundred having been expended the year previous, spread all over Pennsylvania, to pay hall rent, expenses of the lecturers, local expenses of the Chairmen, and so forth. We got through with that, but some of the County Chairmen and a number of the speakers had about come to the conclusion that we have a pretty stingy Director. You know a man has got to be close and a little economical when he has so limited a sum to go on over so broad and important a territory as is under our direction, and hence we should explain that we introduced into the present Legislature a Bill providng for this Division of Farmers' Institute, an appropriation of $55,000, in lieu of $45,000, as was our old appropriation. While this budget, when I left Harrisburg, had not yet reached the Legislature proper, we have good assurance from the Appropriation Committee and the Agricultural Committee and members of the House, that our measure, our budget, will receive favorable consideration. We state that fact in order that those most interested may understand the matter.

Further, we may be congratulated, as workers all over Pennsylvania, on the fact that a Bill was introduced by Mr. North, of Jefferson county, providing for the employment of ten farm experts and counsellors, whose work it shall be to go into the various counties of the State and counsel and advise the farmers relative to their farm operations. I may supplement what I should say, by this, that practically all the farmers of this State represented at our Institutes have sent me resolutions favoring that move. I have on my desk over a thousand letters received within the last ten months, asking that some one be sent to their farms to help them out with some of the intricate problems with which they are engaged there. And now, my friends, the object of this legislation, so liberally supported by the Legislature, only having fifteen votes against it in that body, demonstrates the fact that when the great body of farmers of Pennsylvania ask, with a united voice, for a thing, it is pretty apt to come. It demonstrates the power of co-operation and united effort for a thing seeming to be of much vital importance to the uplift and aid and help that ought to come to the farmer who is endeavoring to adopt the most approved method in farming and, hence, we feel gratified that this fair and equitable request was recognized by the great legislative body of Pennsylvania.

Now, my friends, when I begin to talk about Farmers' Institutes, I sometimes forget where to stop. This meeting was aranged in order that the men who direct Farmers' Institutes in the counties, the men who lecture at Farmers' Institutes, should have full voice in the discussion; and, hence, we throw this meeting open for full and free and fair interchange of opinion.

A Member: As this session is one of great importance and not for long speeches, I suggest and move that the main speakers be limited to ten minutes and the answers to questions, to two minutes.

(Motion seconded).

The CHAIRMAN: It is moved that those who lead in discussion be limited to ten minutes and those who engage in general discussion, to two minutes.

(Motion adopted).

The CHAIRMAN: Now don't blame it on me when you get a little long winded, because I will call you down. The first subject, as it appears on this program, is, "A Retrospect of the Past Year's Work by the Section Leaders;" and the first speaker is, Mr. R. P. Kester, of Grampian, Pa.

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS

By R. P. KESTER, *Grampian, Pa.*

The last resolution adopted was certainly acceptable to me. I have been wondering what I should say on this occasion and to what purpose; because after all, you, fellow-lecturers and others, know, that the most acceptable and effective and impressive retrospect that we have in our work is the purely personal part of it, a part that is not intended, and could not be given in a public way to your satisfaction. However, in these few minutes I want to say that the last year's work was, of all the years which I have spent in Institute work, one of the most satisfactory, not because it was spent in what the people of that locality claim to be the garden spot of the world, southeastern Pennsylvania—I am not willing to deny them their claim—but because of the general advance and interest in agriculture that has been made. The Institutes each year become more interesting, more useful and more attractive. I believe that other section leaders will say the same thing. But I want to tell you that the Institutes held in southeastern Pennsylvania, or the First Section, as we term it in our Bulletin, was one of the best, if not the best, session that has ever been held. And that is not due to the section leader or the men who were with him in that section, but it was most largely due to the fact that the farmers of that section, as well as the farmers of all sections, have an increasing interest in their business and an increasing knowledge of their business.

I found the Institutes last year to be better attended and attended by more intelligent audiences than in any previous year. I hope you will understand what I mean by that. I say, I know, that all section leaders can say the same thing, because the farmers all over Pennsylvania are becoming more intelligent each year. The questions asked were more pertinent, more searching, and I want to tell you, fellow-farmers, you know it, that the man who stands up and talks on agriculture to-day must know what he is talking about or make a pretty good bluff at it, at least. There are questions asked to-day that were not thought of five years ago. And I want to make mention of another fact, also, that the Farmers' Institute work has broadened in those few years through other scopes than simply increasing production. We farmers are beginning to understand that agriculture is a life, that it is more than simply producing food, that it is building a home, that it is developing character and all the things that bear on these questions, that bear on the different phases, are pertinent and proper in a Farmers' Institute, and that is one thing that makes the Institute each year increasingly interesting and increasingly beneficial.

I want to say that my helpers last year were exceptionally satisfactory to the people with whom they mingled. I find that the old skeptical attitude, the critical frame of mind, the tendency to quibble and to trip up and to find fault, is largely done away with. Men and women attend Institutes to-day for what they can learn, not simply to show how smart they are. And more than that, Farmers' Institute lecturers today are there for what good they can do, not simply to show how well they can talk or how good looking they are or how long they can talk. There is a mutual understanding and a mutual effort on the part of the Department and on the part of the people of Pennsylvania, to boost and to help the agriculture of Pennsylvania, and I believe we are doing it. As I have traveled over the State, and I think I have been over nearly every square mile of it, the farmers of Pennsylvania look better in the year 1913 than they ever looked in any previous year in the history of Pennsylvania, and I want to claim part of the credit for the Institutes of our Department of Agriculture having brought about that improved condition, and I am glad to know that the people of the State, and the Department as well, are endeavoring to still extend and improve the agriculture of this State. Now it is up to us, it is up to our leaders in this work, you and me, to continue it sanely and to the purpose of making agriculture attractive, of developing the people, of improving the homes; in fact, of teaching all the things that make agriculture the grandest life and the greatest occupation in which men are engaged.

I know I have not said much on the retrospect; I could get quite sentimental on that part. I made some fine acquaintances, some splendid friends. I have received a great many letters since I sojourned in that part. I know that the work was appreciated. I know they made excuses for our limitations and shortcomings and that they were broad-minded enough to look over the defects, and I think well and kindly of the people with whom I associated during the winter of 1912 and 1913, and whatever is to be done in the future I hope will have the hearty co-operation of the people, as they have co-operated in the past.

Just one thing more I want to mention: The one thing in which the people of that section, as well as the people of all sections, are interested and push to a conclusion or to a definite point, is the fact that there is a general recognition of this fact, that the future of agriculture will depend largely on how we direct and outline the education and development of the young people, the children of the farmers of today. Education must begin there if agriculture is to reach its highest estate and the public schools and the other agencies of education must receive our increasing attention in the future. It is one of the largest and most important parts of our business as adults, more important than to try to teach the elements of farming. Now I want to thank you for your attention. I know that I have not told you much, but I simply wanted to leave this thought, a firm conviction with me, that the Institutes have done an increasing work in the State of Pennsylvania, and it shows on the farms, in the homes and in the character of the people of the State.

The CHAIRMAN: Now we are ready for two minute talks. If anybody has a word to say, let them be prompt. If not, the next speaker will continue this subject: "A Retrospect of the Past Year's Work," by Section Leader, Mr. J. T. Campbell, of Hartstown, Pa.

Mr. Campbell spoke as follows:

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By J. T. CAMPBELL, *Hartstown, Pa.*

I did think awhile ago I would get up a speech for this occasion and I began to talk with my wife. She said, "You are not going to get up before an audience like that and make a speech with hands looking like yours?" I said, "I can put them in my pockets." I had got busy building a barn, I had four thousand chickens to take care of, and didn't have time to prepare any speech, so you are spared the infliction.

I have been in Institute work about eleven years and as far as I have been able to observe, and I think I observe pretty closely, every year has seen an advance in the work. and the past season has certainly been no exception in this respect, and Section 3, occupying the southwestern part of Pennsylvania, certainly had a season of exceptionally good Institutes. We find this, however, that Institutes are no longer, if they ever were, made up of large audiences and large numbers. Some of our most successful meetings were those where we had one or two or three dozen farmers, all interested in the work. Sometimes, in out of the way places, we fellows didn't have a hotel with a bathroom to stay in, but we got down to work, we could do heart-to-heart work with the better class of the farmers in that particular locality. I think the Institute work in Pennsylvania today and its success is going to be determined very largely by our going out and getting in close contact with the better class of farmers in any community, though that number may not be exceptionally large. I know it is being argued in some places that the Farmers' Institutes have accomplished their purpose and are doomed to pass away. I don't see it that way. If the development follows the lines it should follow, I think there is a great work to be done, without any question. I would like to take up that subject and discuss it, but I haven't the time.

I am going to talk pretty plainly a little bit and I want to take up the subject of the future of the things that have somewhat interfered with our work in the past season. I know it is the intention of the Department to overcome these things to the greatest possible extent. I have no particular fault to find, no personal grudge against anybody, that I want to get up here and occupy the time of this meeting airing it. In a good many places we found that our Institutes were somewhat interfered with, because of the fact that we had too many fellows strolling after us. This was not, perhaps, intentional, but it developed a side in the work that was detrimental to the Institute. In some of the Institutes, we had four or five persons, agents for a paper, and these fellows would line up and the farmer was compelled to run the gauntlet to get out, and this was not for the good of the meeting or the good of the work. I have no fault to find with the agents for the papers; they have done splendid work, and I think if they do interfere with our work, there ought to be some measure taken to regulate these things in future years. One man along that line, working in a quiet way, does not interfere, but when you multiply that, you find it does become an interference in Institute work.

And there are other things that are interfering, sometimes, with the work, which, while good in themselves, nevertheless, because they detract from the main thought of the meeting, detract from the concentration of the audiences, from the things that should be of primary importance in our audiences, and have not been conducive to the best interests of our meetings at all times.

I simply offer that as a suggestion. I believe, fundamentally, the great problem before our Institutes, needs to concern itself with the permanent improvement of the soil, because upon that rests our permanent agriculture, and I think it is proper to offer it by way of suggestion, in view of what I have observed in this work. We could profitably devote more time in our meetings to the soil, and the great problem today in our State is not a problem of greater crops, it is a problem of economic production, and we found in an Institute of Pennsylvania a farmer paying $45 a ton for mixed fertilizer that we figured from the price of chemicals that we knew existed, that it could have been bixed at home for $27 a ton. As long as we find dairy men attempting to feed cattle on a mixture of 50 per cent. cotton seed hulls, we must conclude that we are not following economic methods of production on our farms, and that is the thing that we most need to consider at this time. So the Institute has a problem along that line and there never was a time in Institute work when the farmers of the State paid as close heed and attention to the man from the Farmers' Institute who knows something of the scientific side of the subject and has been able to put it into successful practice on his own farm and get results. He is the man they want to hear and there never was a time when the farmers manifested as little patience with the man who has only a theoretical knowledge to guide him in Institute work and has not been able to put it into successful practice, and that is a good symptom; and if Institute work is going to maintain the high plane to which it has arisen in this State, we will have to look out along this line.

The agriculture of our State and nation has taken a turn that does not look good to the man in the field. You hear a whole lot of people reaching out to uplift the farmer, to pull him out of the great slough of despond. We have all sorts of uplift commissions and all that kind of thing, but they are beginning at the wrong end of the line. You put it in the hands of the farmers of Pennsylvania to grow profitable crops and get profitable prices, and without exception they will uplift themselves in every case, and it seems to me that the wild asses of the wilderness have broken into the green corn, if we might put it in that way, at the present time, and we are making a mistake along that line.

There was the president of one of the greatest commercial concerns in this country a year ago made an appropriation of a million dollars for the benefit of agriculture. In the first or second week in last

March, the president of that corporation, on the witness stand, according to his own testimony, said he had in his employ between four and five thousand girls, and according to that man's own testimony, over a thousand of those girls were not getting a wage that enabled them to lead respectable lives and do the work they were required to do. If he wanted to do something, that million dollars would have gone a long way toward paying a respectable wage to those girls, especially, when, as a matter of fact ,the farmers of the United States were not asking one penny from him, and it occurs to me that some people in Pennsylvania are falling over themselves to get some of that money.

Now it looks like this: Agriculture is fundamental and at the basis of civilization itself; it is the basis of progress and improvement in every line in the United States. That being true, it certainly behooves the Nation and this State, the second wealthiest state in the United States, to appropriate and to use money for the promotion of our agricultural interests, and I think if agriculture is going to be helped, it ought to come in that way.

The CHAIRMAN: The next speaker is Prof. Franklin Menges of York, Pa.

Prof. Menges addressed the Institute as follows:

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By PROF. FRANKLIN MENGES, *York, Pa.*

Mr. Chairman, Ladies and Gentlemen: I didn't know that this Session was to be held this morning and I am not as well perpared to talk as I might be. I was working on a number of resolutions that gave us some trouble.

The Farmers' Institute has arrived at a stage that it has gained the respect of the farmer. I know very well and you know it as well as I do, and you know it probably better than I do, that when the Farmers' Institute was begun, there was a tremendous lot of opposition to it. I know in my own county, and I am talking from experience, I know that in my own county we could not get a baker's dozen of farmers together to attend an Institute. Last year and the year before we had at the Institute in York county from eight thousand to ten thousand farmers. I suppose the records of the Department will bear out that assertion. And not only is that the case, but those farmers came knowing very well that there was going to be something said and done that would be for their benefit. It is true that York county is an agricultural county. The City of York is the third manufacturing or industrial city in the State of Pennsylvania. We have a splendid market for our products, not such as you have in Washington and Allegheny and in Beaver and in Butler and in the rest of the counties surrounding Pittsburg—we don't have a market such as you have, but we have a good market for the products that are produced on the farm, in the City of York.

The farmers have gotten such instructions out of the Institute that they have been able to supply that demand in such a way that both the farmer and the consumer are benefitted by it.

We have a system of markets in the City of York and we have had them for the last one hundred and fifty years or maybe two hundred years, I don't know, but at any rate, for the last one hundred and fifty years, the farmers of the county of York have come right into the town and they have sold on the curb of our city the products that are produced on the farm directly to the consumer. It has made York the industrial city that she is. There was a time when a family could live cheaper off of less money in the City of York than in any city in the State of Pennsylvania. The manufacturers came to our city for the purpose of establishing their plants, because they could get labor there and they could get food for their labor at less cost than they could get it in any other place in the State of Pennsylvania. I say it has made York the industrial city that she is.

Now, my friends, York is not an exception. If the Farmer's Institute has been a factor in developing an industrial city, making it what it is today in one county, why is it not possible for the farmers to join hands in Washington county and make Washington or all these western counties the agricultural counties that they have the opportunity of being? Why, my friends, there is nothing to equal the opportunities that are lying at the door of the people right here. You can produce farm products as cheaply as we can. Yes, you can, no use shaking your head about it. You don't deserve any more for your work than I do and you can't do any more than I can, either. Well now, I say, if the possibilities are here, why not take advantage of them? I held Institutes in this section during the past winter. Maybe I ought not to say it, but I think I shall. I want to say that the farmers of this entire section, so far as their opportunities are concerned, are as dead asleep as they can be. You could not put them to sleep any more soundly, I believe, if you would apply something. How do you like that?

A Member: That's the stuff; give it to us.

PROF. MENGES: Well, I'm glad you say "amen," anyhow. I am not a Methodist, but it does me a lot of good once in a while when a fellow says "amen." Yes, now I say here are the opportunities. The soil is here. Why not take advantage of it, and the Farmers' Institute has been in your section—I don't know how much good we have done, I haven't any idea, only I had the compliment paid me and the men that were with me, and I want to tell you who they are, because I don't want to take all this thing to myself. My friend, Dr. Conard, is here, and my friend, Mr. Fassett, and my friend—he looks a little like a Jew—where is he? Mr. Kline. Oh, there you are. And several others. I say I don't want to take all thos credit to myself, but I had the compliment paid me during the sessions of this Institute, coming from the various counties surrounding Pittsburg, that the people didn't know that there was such a capacity in the Farmers' Institute as was represented in there.

Now, how do you like that? I am not saying this—it comes right to me, and I can tell you who the man is if you want to know, but I won't do it now.

Now, my friends, with all this at the disposal of the farmer, it looks to me that it is time that we should begin to wake up and that we should take advantage of these opportunities that are lying at our door and the Farmers' Institute is bringing it to you. It is the greatest institution for the education of the farmer that has yet been inaugurated. I mean for that average fellow out there, that man that cannot go to college, that man that can afford to take only one or two agricultural papers, and that man that don't understand the business as he ought to; that man that has never had any training except what he got from his father and his grandfather, and maybe they were poor farmers. I mean that man. He is the average fellow and he is the fellow that we have to take and raise him up to a higher standard and that is what the Farmers' Institute is doing, and I want to tell you it is doing it in the most effectual way it has ever been done. I know whereof I speak. Why, my friends, our agricultural college has got more advertising, it has got more help, it has been brought into greater prominence through the agency of the Farmers' Institute than through any agency that has been established in the State of Pennsylvania, including the agricultural papers.

Now, who has done it? That is the question. Why, you have done it, you are the people that have done it. You have done it through the agency of your Department of Agriculture; it is yours, and if it is yours, then the possibilities of what might be done are well nigh unlimited, don't you soo? Just along these lines, you can have the very things you ask for, for the purpose of lifting up that farmer and making him a different kind of a man and solving this great problem that we are talking about; and there is more nonsense talked about in regard to this high cost of living than anything I know of—more nonsense. I told you the proposition is in your own hands. The posibilities, my friends, of the State of Pennsylvania, have not been touched. She has the greatest variety of soils of any State in the Union. Take the soils of the southeastern part of the State, among the most fertile anywhere. Take the soils of the northeastern part of the State, adapted in the most splendid way for the raising of the hay grasses and the dairy industry. Take that wonderful ridge that passes through the central part of the State on top of the Allegheny Mountains—that plateau. And right around the City of Altoona or right west of it,—and then take that wonderful northeastern section where God Almighty raises apple trees without ever any being planted, the very garden spot to produce the finest apple that has ever been made—the Northern Spy.

A Member: You are right.

PROF. MENGES: Certainly I am right, I wouldn't say it if I didn't think it was so. I am not advertising these places, but I say it is the place where this apple can be raised to perfection, and you know that only here and there through that entire section do we find an orchard used for that purpose. And then take our southeastern section of the State of Pennsylvania, where the Secretary, the Assistant Secretary of Agriculture of the National Department, told me himself "Here you can raise a larger quantity of corn to the acre than they can anywhere in the United States"—the other grain section. We can do that kind of thing.

Now, my friends, with all these adaptations, don't you see what a tremendous work there is to be done by somebody to put the farmer in the right relation to his climatic and soil conditions and get him to produce the necessities of life that the nations of the world are demanding every day?

The CHAIRMAN: I call your attention to the next speaker on the program, Mr. L. W. Lighty. You remember I had read in your presence a letter stating that the sickness of Mrs. Lighty prevented that gentleman from attending; hence we will pass to the next speaker on this important subject, "A Retrospect of the Past Year's Work," Mr. D. H. Watts, of Kerrmoor.

## A RETROSPECT OF THE PAST YEAR'S WORK BY THE SECTION LEADERS—Continued

By D. H. WATTS, *Kermoor, Pa.*

Mr. Chairman, Ladies and Gentlemen: It is a pleasure to me to appear before my co-workers in the Farmers' Institute work. I feel, however, like my friend, Mr. Campbell, a good deal like taking this position here this morning, and that is, I am illy prepared. I feel that this is a precious time, when we talk about things pertaining to the Institutes, to their promotion over the State, and on considering coming down here to Washington the other morning, after I had arisen at a very early hour, I said to Mrs. Watts, "Now, if I could only be excused from this duty and remain at home, I would feel a great deal more comfortable. I have a little duty to perform down there, though, and I guess I'd better go." "What would you do if you'd stay at home?" she asked. "I believe today or this morning I would finish building our ice house." It felt a little like that to us up in the hills of Clearfield county lately and our pocketbooks will be minus something next fall, from the appearance of things.

I didn't arrive here in time to hear the opening exercises of this splendid meeting. In thinking about the town of Washington and its location and former history, I could not help think about my earlier career in farming. My first fancy in livestock was sheep, and one time I imported into the county some foreign sheep of a particular breed now very popular, and in order to understand something about the sheep, I had taken a journal, and on almost every page in that journal, which was indeed a great help to me, I found the name of Washington, Pa. This was the shepherds' rendezvous; here they came with their flocks and no doubt with their crooks. Today this is the rendezvous of the agricultural shepherd and his crooks, perhaps.

I hardly know what to say to make good use of the time. I have been for one winter manager of No. 5 Section. I found one man pitching his tent towards the smoky City of Pittsburg last winter and another towards the City of Brotherly Love, and another Mr. Campbell, in the hills of Pennsylvania, and another, Mr. Dorsett, pitched his tent toward the City of Mansfield. And I, with our little band, pitched our tent toward the great commercial metropolis of Scranton. It is a great country up there, a very great country.

Now, what shall I say reminiscent of our travels in that country? At the start we found a very pleasant time. The local people helped us out very tenderly and the weather man at the time assisted. We found a diversity of conditions. We found local people who were liliputians and others who were gigantic in intellect and physical ability both. Perhaps in the people who came, apparently, to help them out, they saw liliputians as well. We found great diversity of effort and results in institute localities. There is something peculiar about that. We would find a place that was wonderfully active in Institute work, the work is a success in every feature, it keeps the Institute lecturer just hoping to keep up with the people in that locality, and we move only four or five miles and find just exactly the reverse,—we can hardly temper our thoughts in language that apparently can be understood by a portion of the audience.

Why this great difference? There is evidence enough that we have still before us a wonderful work to do, and then our study comes in, how to reach all these people? In most of our Institutes we find that the front seats and the "amen" corners are occupied by the same people each and every time. They are the leaders of the community, take an active part, no doubt, in everything that is carried on. Those communities are self-buoyant, but the others, as has been said by other Section leaders, are not.

The Institute work is a wonderful work. The more I think of it, the more I contemplate the field of activity open to us, the opportunities that confront us, the more I see the magnitude of this wonderful work. We talk about the soil, the native soil, and the conservation of soil fertility, the restoring of the worn-out soil, the growing of crops and animal industry, the school and social condition of the neighborhood, and all these things, and in my estimation there is no greater thing today in the rural sections than a general educational and cultural uplift. I believe that because I am the father of a family of six children. I own today a farm and farm buildings that have been hewn out of the forest and the hills with a great deal of labor and expense. Today, viewing life with less sentiment perhaps, than a youth starting out, I would scarcely take a farm in a vicinity of that kind, not to say anything disparagingly of my native county, but I would not take a farm in a locality of that sort as a gift. Now, you may think that is cruel, you may think that is radical, but virtually I would not, because I view the social and educational facilities of the neighborhood as things of most importance. Of course, we must have crops, we must have the money before we can have these other things, but when we have money and have means, we should look first to the general uplift of those communities. That is the mission of the Farmers' Institute worker. He must help them get the money, help to show them how best to serve that community in a general uplift. That uplift is needed, but I want to tell you, it does not have to come from the city, but from among ourselves. The best governed man is the man governed from within, and this is true of communities. The finest and best educated community is a community educated largely from within. I want to tell you that the day must come when the farmers will no longer ship their young people away on trains and board them at our expense and depopulate the rural communities of young blood. We need to enliven our rural communities; we need more educational institutions in rural communities, and then we will have more homes and more life. There is an old adage which says that where there is life there is hope. I want to reverse that adage and put it the other way, that where there is hope there is life, where there is faith there is life, and we want to get the hopes of the farmer and rural population raised up a little higher, we want to get more faith in their occupation and get those good things around our farms and in our rural communities that our good friend last night thought we should take the family away in an automobile to reach them. I am not in for that sentiment; I want to bring that environment to the rural community that will make every neighborhood worth living in, that will make the farm of some value to us, so that it is not only a farm, not only a business enterprise, but in a true sense an intellectual and cultural center.

I have nothing to say of a complaining nature relative to the work of last winter. When we go home to our farms and delve into the work of the farm, the winter's work having passed, looking backward, it seems like the reverie of midnight dreams. We cannot recall all the little things. We have nothing serious to remember in last winter's work. We can see where we ourselves might have done better for the local people and sometimes I can see where the local people need in that locality a Moses to take hold of the upraising of the local work and lift it to a higher plane; and yet we don't understand, as strangers in a community, just what the encumbrances are in that neighborhood and may cast a shadow of doubt on the local management, when no doubt they are doing the very best they can under the circumstances. Mr. Chairman, I think I have occupied enough of your precious time and I shall leave the floor to other workers.

The CHAIRMAN: Now, my friends, you have listened to the discussion of the leaders of the Sections. This meeting is open for the man in the pew, now to see what he has to say about this matter. Two minutes, remember, though; some of you fellows are pretty long speakers.

MR. BLACK (Mercer county): I want to confess that it was I who shook my head at Prof. Menges when he said that we could raise things as cheap here as in York. We are up in the clouds 1,400 feet above the sea and we are 125 miles further north, at least, making 4 degrees difference. You have much longer summers in York than we have in Mercer county. It is the long winters that put us to sleep here; even the ground hog in Mercer county, after taking a little nap, goes back to sleep. If we had as long a summer as they have in York, possibly we would get wakened up to our opportunities. The Professor scolded us up in Mercer like blazes and I expect we needed a little of it, but he was a little too severe, coming from a different soil and climatic conditions altogether. He stated a moment ago that York could beat any other county in raising corn and he ought not to be so severe on us fellows that don't have quite the conditions he has in York county.

A Member: I would like to call up the question that the first speaker raised in regard to education in agriculture in our common schools. If any of them can put out a plan to secure that from a teacher, I would like them to do it.

The CHAIRMAN: Now, gentlemen, you have heard the question offered by the gentleman, of education in our common schools, referring to agriculture, I have no doubt. How can we get a plan by which we may secure that teacher in the country school who will develop agriculture in that school? You have asked a very important question. Does anyone want to answer that in two minutes?

A Member: Just one word; we have at the Pennsylvania State College a very charitable proposition, whereby they offer to give the teachers of Pennsylvania at almost a nominal expense, some training in teaching agriculture, and country school directors may do much to foster that by insisting that the teachers that they employ for the coming term or for the next year, shall take or shall have that training, and insist upon it. It is the cheapest part of the education of the teacher that they can get and the most needed by the country school teacher.

MR. STEVENS: In New York State they have helped to solve that problem by insisting that every district superintendent of schools shall pass a thorough examination in agriculture before he is eligible to hold his position.

MR. J. ALDUS HERR: It was my pleasure a few years ago to visit in Madison, Wisconsin, some of the Congressional agricultural schools of Dane county, a proposition which I brought before the members of our House from Lancaster county, was this: Why not draw up a bill and have it passed by the Legislature of Pennsylvania, creating a Congressional Agricultural School? Now, take Lancaster county, because I am more familiar with it, or take your own county of Washington, the City of Washington located nearly in the center of your county, take your Poor House Farm, which I believe you have one instituted, a school there,—your facilities to that farm from the county are fairly adequate; the people who want to go to school there, give them a thorough course in agriculture, let them take their course of study, and then the next period let them go out on the farm and put it into actual practice right there. You have not only the training of the mind, but the training of the hand with it. The way your farm is located, especially in Lancaster county, with our trolley system there, three-quarters of those pupils during the evening could go to their homes and not lose the influence of the parental home—they would not get away from that.

My theory has been, and I believe it is correct, the way to teach a thing is to do it. It was my pleasure last fall to visit the institution in Alabama, the colored school down at Tuskeegee, and the first motto

I saw on the wall when I entered the institution, was, "We learn by doing," There, I think, gentlemen, is the basis of our education. Teach them by doing.

The CHAIRMAN: Any other gentleman or lady—ladies, don't think we've undertaken to slight you at all—if you have anything to say, speak right out. We have some lady institute lecturers here and we want to hear from them. Mrs. Foulke, have you a word to say?

MRS. FOULKE: This is a subject that I have been very much interested in, and I have lately been in New York State and been interested in the agricultural movement in the high schools of that State. The State there has helped the schools; they pay one-half the salary. We have nothing here like it. They have an agricultural teacher in the high school that will guarantee twenty-five pupils, and those children are supposed to go out on the farm and do farm work, and part of their course is the work they do in their own homes. Their fathers and mothers or guardians can keep account of that and help to put them through, so that when they graduate they have so many counts of home work done. That will keep the children in the home and keep them interested in our farms. but that has State patronage that we don't seem to give much of in Pennsylvania. We are talking about it, but I am afraid some of you men will have to get busy with that, because we poor women can't vote, we can only nag you. You will have to do away with your small country school and combine your schools, so that children will come from far away districts and be brought in and taken back. It is worth while. It is a big question that I could not answer in the two minutes allotted to me.

PROF. SURFACE: I have for years been much interested in the subject of agriculture in the country schools, as a teacher, and now as a parent who has children in the public schools in the country. I feel that the teacher first should know the subject. We, as practical farmers, cannot do a thing that we don't know, and we cannot expect any person to do the things they don't know. We cannot expect a teacher to teach agriculture who does not know the subject. That teacher must be prepared. If a special appropriation is required, if special work is to be done, then there must be special compensation. It is unjust to the teacher to add to him the extra burden of preparing to teach an extra subject without compensating him for it. If we are growing some extra produce, we expect to be paid for it. If we are growing some extra produce, we expect to be paid for it, and when it comes to the subject of a proper compensation for the teacher who is prepared adequately to teach the subject, I concur in the necessity of consolidated country schools. The best schools in America are in the regions where they have them. In such places it is possible to have supervisors of agriculture to go from school to school and to help the teachers and see that the course is practically carried out and taught.

We are now coming rapidly to a system of county supervisors of agriculture in Pennsylvania, as I think you all know. It would seem that it might be possible for the county expert in agriculture to do a great deal of valuable service in the public schools of his own county, by acting as supervisor of agriculture and helping the teachers and getting them in a condition where they may stand on their own feet in teaching the subject, and they can get better assistance from the county superintendent of agriculture or county expert than any other source. They have other sources to which they can appeal. They can get the short term or special term at the College, or they can get information by writing for it, but they need that personal contact with the individual who can help them over their difficulties, and I believe we are producing the means of working out this important problem of agriculture in the public schools.

MR. BLYHOLDER: I am very much in favor of making agricultural education one of the chief cornerstones of our talks at our Institutes, and I am further in favor, very much, of a resolution that I had the honor of helping to adopt a year ago, the day after we met at Towanda. If I recall to memory, I had the honor of being one of your representatives at an educational meeting in Harrisburg, where many of the educators of this State had assembled, as well as from New York and Ohio, to discuss the matter of agriculture in our public schools. A resolution was there unanimously adopted, asking our Superintendent of Public Instruction to have his superintendents throughout the various counties of the State examine the teachers in agriculture, and I believe that that is the point to insist on, because, if the teachers know that they are to be examined in some subject as a branch, they are going to prepare themselves. And let us pass resolutions or go through the channel to go to those who are in authority, to demand that. We cannot wait until the public ask and demand it. If we had waited until the public demanded the public school system, we wouldn't have had it, and those of you who know the history of it, know that it had to be forced through our legislature when some who were its opponents were kept outside of the hall. So let us have the examination of the teachers, and then, when we have the teachers, a way will be provided. It seems to me that is the channel for us to work through, have the teachers prepared and demand it of them, and we will have it.

MR. GEORGE (of Indiana county): One thing I would like to mention, that one of the Section leaders spoke of in his talk, and that is the trailers that we sometimes have after us at our Institutes. In Indiana county last year we had no less than four at some of our meetings. Now, as the gentleman says, we get out among the farmers, we don't try to get into the large towns where they have hotels and good accommodations, but we get into small towns, so that the farmers will come, and we don't have very large hotels. We generally try to prepare accommodations before hand, unless Brother Seeds is along, and we sometimes have trouble getting places for him, but these agents that have been spoken of will come out after the last session and get across the country and get ahead of us and get the best room in the hotel, very often, representing themselves as members of our party, and when we get there, we find conditions rather unfavorable, and that is one of the reasons. As the gentleman said,these agents detract from the Institutes by buttonholing the men in the audience and keeping them out of the sessions and detracting in other ways.

Again, in our means of conveyance from one place to another, where we have a hack to take our men from one meeting to another, they will crowd in, and it makes our means of conveyance not very pleasant to us or to those that we are taking with us. While I hope that every farmer in the State and his family are reading some good agricultural paper, and I hope it may be put into every family, I do wish there were some other means of getting it into the family than by having these agents follow the Institute people around .

MR. C. H. DEWITT: I have very little to say, but I wish to say this: I am slow to find very much fault with those who are my superiors in office. Tioga county has been blessed with a good corps of instructors, and I want to say that publicly, and they have aided the people of Tioga county, who have availed themselves of the meetings held there; they have been instructed and the meetings have been very profitable to those who attended and to the instructors. I just wish to say to you, as one of the County Chairmen, go right on, regardless of any outside criticism. You are in the right and the right will prevail. The Secretary has no small job on his hands with you fellows to take care of, and I realize that, and if he does as well all over the State as he has done by Tioga county, we certainly are not going to find any fault with our Secretary.

In regard to the question of schools, our town of Mansfield has a State Normal School. Two traveling men were talking there last Sunday—they spent the Sunday in the town. I overheard them talking about the schools of Pennsylvania in comparison with the schools of New York State. They were both New York State men; I knew one of them, lived in Elmira, New York State. He said that the school system in Pennsylvania is in a higher state and in a better shape than the schools of New York State, that a person educated in the high schools and in the normal schools of the State of Pennsylvania is far superior to the scholars of people who are educated in the schools of New York State. Now gentlemen, with the fine appropriation that our Legislature gives us for our schools in this State, I should be, as one, loathe to find any fault with them.

Now one thing else occurred in the Institute, to our knowledge. We, of course, in and around Mansfield, have taken up, I think, eleven schools in the township and concentrated them in the village of Mansfield, which is a grand success, and when our lecturers were there last winter, they were invited to come there when I was not using them, in the hall, to come and talk to those children upon the different subjects that they were to talk upon in the Institute proper, and it was a grand success, and many of the children did, I hear, say on the street some of the things that were said to them by our lecturers. I wish to say to you lecturers, "Go along," and to the Secretary, "You are making a success of the Institute in the State."

**MR. STOUT** (of Schuylkill county): In relation to this matter of what have been called trailers after our Institutes, I don't see that there can be any reasonable objection to these people who represent newspapers going along with us and soliciting subscribers. The fact is, they are a very congenial and companionable set of people, very intelligent, sent out by these publishers, and they do a whole lot of good by getting these subscribers; sometimes I think they do more good than we do. They reach the farmers weekly and we go only once a year. They are a companionable class of people and I am willing to share my bed, if necessary, with those men who are sent out by these publishers, and just for their comfort.

**Mr. STEWART** (of Greene county): I want to endorse what has been said about these newspaper men. I don't care who comes behind, I am going to be before, and as the gentleman has said, these newspaper men cut across corners and get over to the boarding house and get the best place. There is no business for a County Chairman to permit that kind of thing. We can secure those places before the newspaper men come in and they've got to take what is left. Sometimes we are disappointed, but we have done everything we could to provide entertainment for those fellows before these newspaper men come. I want all the newspaper men to follow me that wish to, and if they interfere with the business of the Institute, I have the courage to tell them to wait till we get through and then prosecute their business. We want them to advertise everything we do. They are in sympathy with us, they are co-workers with us if they are earnest, and I believe most of them are. I invite our newspaper men to come out. The only trouble is, they don't come if it's cold weather and too far from the county seat. I believe our good friend is in the wrong in this respect in discouraging the men whom he calls trailers.

**A Member:** I just wanted to add a word to what Mr. Stewart has said. I have had the gentlemen from these agricultural papers follow Institutes in our county for the last eight years and I am just as proud of them when they are with me as I am of the lecturers. One or two of them are writers for some agricultural paper and they always write nice things about out Institute, which go before the public all over the State of Pennsylvania and elsewhere, and our Institutes have been boosted largely through that class of people. I invite them to our county and am glad to see them.

**DR. W. FRANK BECK:** I represent two classes of people: I am a member of the State Board of Agriculture and also a member of a large Chamber of Commerce. What are we going to do with the city farmer? Around Altoona, the farms are largely being absorbed by the city farmers. In the valley in which my farm is situated there is not one farm but what is owned by city people. In one county, 450 farms were sold to 50 people. Those people are moving on those farms. They are city farmers and they are a class of people who must be absorbed and recognized and reckoned with. The question before us is one of the most important questions—What are we going to do with the city farmer?

PROF. MENGES: I would like to introduce another subject here, that is the advertising of the Farmers' Institute.

The CHAIRMAN: Well now, these other fellows will introduce that for you a little later.

PROF. MENGES: Well, I wish they would.

The CHAIRMAN: Gentlemen, you will notice the program we have here, No. 2 on this program, "The Farmers' Institute, from County Chairmen's Point of View." There are six or eight of you here and a lot of delegates besides. Now comes the turn of the County Chairmen of Institutes.

MR. ANDERSON (of the Pennsylvania Farmer): I think a point that I wanted to bring up will come up very nicely under this subject of advertising the Farmers' Institutes, and I have been very much interested in the remarks that have been made here relative to the so-called trailers. Now that is right in our line of business. And we all feel that there is no legitimate objection to some of the methods that have been used, but I think more particularly to the fact that there have been so many newspaper men in the field, and I think that all of the newspaper publishers recognize the fact that the control of this feature is in the hands of the Institute men, and I am sure that if their numbers become so large that these agents become troublesome to you in any way, that you will find that the publishers will be more than glad to co-operate with you in any scort of a plan that will put us all on the same basis, and that is all we ask, and I am sure the publishers will all co-operate with you in that work. I was particularly pleased by what some of the gentlemen said and the very kindly way in which you were welcoming these men to your Institutes and the view you took of using them to advertise the Institutes.

Now, that is also our business and we are more than glad to have notes from county superintendents on the work of the Institutes and also glad to have notes from our agents. We instruct our agents to give us reports on the good, live meetings that are held in the different counties, so that we may get this work into our columns and give the news to our readers, and, as I say, this will probably come a little later in our discussion of advertising the Institutes, and Iam sure you will find all the publishers of the agricultural papers more than glad to help you all they can in tihs work and at the same time to regulate this question of the so-called trailers, if they prove troublesome to you in any way.

The CHAIRMAN (Director Martin): The Chairman will say one word: We have uniformly opened up the way for the agricultural press to visit with us at our Institutes. Within the last two years, the agricultural press have taken a more active interest in the Institutes and in presenting the claims of their papers, and I will heartily co-operate with the agricultural press of the State in making a proper allotment of Bureau of the Institutes, in which, probably, at no one meeting there shall appear more than two representatives of the press. Now, we can get along first-rate with two, but when half a dozen come and they form in line, just as some of these gentlemen have said, it does become a little annoying. We want to be frank about this. You are welcome, you have helped us in many ways, and you are one of the agencies in the uplift and upbuilding of agriculture, and far be it from the management of this Bureau of Institutes to say "no," but we feel encouraged when a representative of one of the leading agricultural papers has said what he has. I refer to the gentleman to my right, the representative of the Pennsylvania Farmer, and I have no doubt but what this question of representatives of the agricultural press can be adjusted to the full satisfaction of all concerned.

Now, if there is nothing further on this subject, we will take up No. 2, "The Farmers' Institute, from County Chairmen's Point of View." You will notice, gentlemen and friends, there are two or three angles to this thing. The County Chairman of Farmers' Institutes is the manager in the different counties. He has an immense amount of work to do. He has the advertising of these Institutes, selection of locations. Then he has to boss the speakers that are sent out, and that is a big job sometimes. And he is the fellow I want you to listen to a little while and see what he has to say about this matter. And I should explain that sometimes, you know, the "last shall be first and the first shall be last." You have heard that somewhere or other. Mr. J. Newton Glover has informed me that he has a call to go home this evening which cannot be well avoided, hence, we will begin at the last number with Mr. Glover, in order that he may be accommodated. His subject is, "Which is Preferable, Written or Oral Questions?" That is, shall we write the questions in the Institutes or just get up and ask those questions? Now, Mr. Glover, we will be pleased to hear from you.

## THE FARMERS' INSTITUTE, FROM COUNTY CHAIRMEN'S POINT OF VIEW

### 1. WHICH IS PREFERABLE, WRITTEN OR ORAL QUESTIONS

By J. NEWTON GLOVER, *Vicksburg, Pa.*

Generally speaking, written questions are preferred, as the Chairman usually has a period for written questions from the box, which he assigns to a suitable speaker to answer by giving all the facts he knows on the subject asked. But frequently a speaker makes a statement which is not fully understood or he does not go as far into detail on some point as someone in the audience wants him to go; then it is better to have an oral question right on the spot or at the close of the talk to further enlighten or answer the question which has occurred to the one in the audience, rather than have it written out and answered later, because this person may not be present at the next session when the written question could or would be answered.

Some persons will ask questions when they will not write them out, even on the tablets so kindly furnished by Hon. A. L. Martin. Where a poultry, fruit or a road session is held at an Institute, some persons will attend only the session discussing the questions which interest them and the oral questions give them the chance to get in close touch with the speaker, as the written question does not.

Then, oral questions bring out and answer many questions which benefit the entire audience and it saves the Institute speaker the extra work or effort in answering questions before and after sessions, which are asked by persons who would ask them in a meeting and help anyone who wants to know just what the speaker is trying to tell one person privately. So, on the whole, oral questions are preferable and do more good than written ones. Questions show how an audience is interested, so try to have as many good questions as possible.

The **CHAIRMAN**: The next will be, "County Organization of Institute Committee," by Hon. H. G. McGowan, of Geiger's Mills, Pa.

## 2. COUNTY ORGANIZATION OF INSTITUTE COMMITTEE

By HON. H. G. McGOWAN, *Geigers Mills Pa*

Mr. Chairman, Ladies and Gentlemen: Looking over the program, noticing that there are six succeeding speakers, if a point or two was thrown out by each speaker, a successful Institute could be managed, however inexperienced the manager might be. Any Institute will be an absolute failure unless there is a proper appointment of committees. The program, however, states "Committee." Now, as Institute Managers, we are all upon that equal footing so far as the time set apart by Act of Assembly for the appointment of places where Institutes are held, is concerned.

Now we must, in the appointment of these Committees, have a system. The operation of the great Pennsylvania Railroad would not be successful unless they had their great system. Our farm operations will not be successful unless we have a system. Therefore, my experience as an Institute manager has led me to establish just a little system in reference to the organization of Institute Committees. You all well know, as Managers, that the second Tuesday of June, at 1:30 in the afternoon at the county seat, is the time appointed for the selection of places for holding the Institutes. Now, prior to this time, I write to the secretaries of the various farm organizations in our county. We have two county agricultural societies, two granges, two farmers' unions. Therefore, this Board is composed, together with myself, of seven members, and they are always present; there is a reason for that, and I might say why. After writing to them, I prepare for their being present in this way: you know that the Act of Assembly allows them two dollars for attendance at that meeting. I don't have those men wait until I communicate with Brother Martin; I prepare myself with new, crisp two dollar bills right from the bank and as soon as we transact our business, I take the receipts of these gentlemen and give them the two dollars. That is a great incentive to have a good attendance at every annual meeting.

Now what I want to say is this: what we do at that meeting after we select the places for holding the Institutes is the appointment of a chairman of a local committee for every place selected. We discuss his ability in every way that our knowledge will permit; we select the very best man in his community. Now, that is the start; that gives the place where the Institute is to be held a little advertising. The man is proud to be selected as chairman; he begins to talk the Institute up; the matter is left at that point for a while, and no more is done, so far as I am concerned, until about eight weeks before the time of holding the Institute. I then communicate with this gentleman who was previously appointed as chairman of the local committee and have him call a special meeting to consider plans and make arrangements for holding the Farmers' Institute. He does, and there is where the balance of the committees are formed. We always have a good attendance at that meeting; it has never failed since I followed that plan out. We then augment this local committee and have possibly ten or twelve on the local committee. In addition to the local committee, we have, or appoint, an executive committee with this same gentleman as chairman of the executive committee. This committee consists of five persons. For what reason? For this reason, that they can call subsequent meetings and complete the arrangement of the program.

In addition to the executive committee we have a query committee. This is an important committee for this reason, that many an Institute lags on account of the failure upon the part of the audience to take part or be responsive. We select as chairman of this query committee a man who has had some little experience before audiences, who can pass down through the aisle gracefully and distribute the blanks sent us by Brother Martin, and who, before the audience, can stand up and read the questions. That's the query committee. And I want to say that because of the work of this query committee our Institutes have all been successful, as can be attested by Brother Watts and Brother Herr and others, which was due to the way the audiences responded, largely on account of the efficiency of this chairman of the query committee. We also have a committee on music; that is not so essential, but we appoint a committee on music of three or four or five and advertise this as a footnote upon our program: "The music of the Institute at Washington will be in charge of Prof. John Smith," or whoever he may be, and that ends that.

So, my friends, that is about what I have to say in reference to the appointment of committees and I think this is a plan that we can well follow out. It simply gives the Manager a chance to at once communicate with the chairmen of the local committees and then everything else will work out nicely, followed by energetic work on the part of the County Chairmen. Now, my friends, as Institute Managers, let us put our shoulders to the wheel and let us work with an impulse and a feeling that will bring about greater development along agricultural lines in this great Commonwealth of Pennsylvania.

The CHAIRMAN: The next subject is, "Responsibilities of County Chairmen;" and I want to say that there is no part of this great organization upon which there rests a greater responsibility that these very men who are appearing before you now, the men who have in their hands and within their power the practical control of this work in various counties. We had assigned upon this subject to Mr. P. S. Fenstermaker, of Allentown. But I am in receipt of a letter from him, giving good and sufficient reasons why he could not be here. I will explain, that previous to assigning Mr. Fenstermaker, I had requested Mr. J. Aldus Herr, of Lancaster county, who then was sick, but has recovered, and we will ask Mr. Herr to devote a few minutes of his time to this subject.

## 3. (a) RESPONSIBILITIES OF COUNTY CHAIRMEN

By J. ALDUS HERR, *Lancaster, Pa.*

Mr. Chairman, Ladies and Gentlemen: I am sorry on your account that Mr. Fenstermaker is not here. It would relieve me quite nicely if he were present at this tims.

In reference to the responsibilities of county chairman, if you have never filled that position, there is a little more responsibility connected with the position than you have any idea of. First, and the most responsible part of it, the person who takes the position as County Chairman should be, virtually, a first class farmer himself. He should put into practice what he hears and what he advocates and has advocated to his audience. Very little good indeed does the argument do to the audience and very little good does what they hear do, if the man who appears before the audience as County Chairman does not make his teachings effective in his own hunting ground; there isn't any doubt about that. We should give all due deference to scientific principles, but back of all that we must have practice. The man who takes the responsibility of County Chairman should have some compensation for the actual number of days put in. We know you will say he ought to do it for the good of the cause and as a matter of patriotism; but, gentlemen, just for that cause, some time ago I was confined to my bed for two months—patriotism—laboring for more than a dozen institutions, who piled up more work on me than I could do.

Now, gentlemen, if someone of the neighborhood is asked to be your county leader or County Chairman, if he were not of some value, he would not be asked to do it. If you don't think so, get some one else to do it. I don't say to pay any compensation, particularly, that amounts to much, but pay sufficient, so that I can hire some one in my place when I am not at home to perform my labor a few days. I don't ask for seven or eight or ten dollars, or anything of that kind, but the man who is engaged in active farming or any other business can ill afford to take that much time and devote it to things of that kind.

In arranging for the different committees, you have to be careful. You have to be careful in the selection of your locations, and one of the great troubles we have in a few of our meetings in our county is, we have a good deal of county pride and some of the people in our audiences wish occasionally to show themselves and crowd the State speaker aside and take possession of the meeting. The County Chairman must officiate and say: "Gentlemen, we have you with us all the time and we will take the State speakers now; the home talent we have with us all the time." There isn't any doubt about that, we have some struggle in that way. In reference to our numbers, our numbers are not as great in our county as five years ago, but the interest in the exhibits in our meetings is greater than ever. The man who is actually interested and wants to know will attend. The quality has improved, and if the people who are not interested do not attend, we don't need them. It is the man who is interested and takes an active part that we want.

It was moved and carried that the paper of Mr. P. S. Fenstermaker, on "Responsibilities of County Chairmen," be embodied in the proceedings.

Mr. Fenstermaker's paper is as follows:

## 3. (b) RESPONSIBILITIES OF COUNTY CHAIRMEN

By P. S. FENSTERMAKER, *Allentown, Pa.*

If the Farmers' Institutes to be held this coming winter are to be a success, the first, as well as one of the most important responsibilities of the County Chairman is that he sees, at the June meeting of the County Committee, that suitable places are selected for the holding of the Institutes.

No application for an Institute should be considered that is not easy of access by team, trolley or steam road by the agricultural people of a county. Also, that it does not necessitate speakers leaving a crowded, ill-ventilated hall at night, covered with perspiration and obliged to take a ten or twenty mile drive to the next place of meeting, in all kinds of weather. From what speakers have told the writer, that not infrequently, after arriving at destination, they are consigned to a room and bed with the temperature of a refrigerator, and were kept there until the next morning at 9 o'clock.

A County Chairman of any community that is obliged to put up with such accommodations certainly has the sympathy of the writer. In Lehigh county we demand places that are easy of access, warm bed-rooms and good food. We believe that Institute speakers are human beings same as ourselves. Farmers have long ago discovered that even the lowest of our domestic animals do their best when kept comfortable. Why not make things easy and pleasant for the noblest band of philanthropists under the sun, viz: the Farmers' Institute speakers.

The next responsibility, is the making of a suitable program with not more than two topics for a session, allowing plenty of time for questions and discussion. If the audience is slow or backward, the Chairman should endeavor to get the audience interested—to make them feel at home, and that it is their Institute. Once you get them thawed out, the success of the Institue is assured. A little music or short recitations once or twice during a session may be of some benefit to relieve the monotony. Topics by local speakers are not of much value except perhaps to take the place of a State speaker when absent.

The people of a community attend sessions to hear experts, men who have done things and who have a reputation in the various lines of agriculture, and not their neighbors, whose views are already well known. If you are, for various reasons, obliged to accommodate some of these embryo Henry Clays and Dan. Websters, place them on the Saturday evening sessions and thereby relieve the regular speakers, so they can leave during the afternoon session to visit their homes and commune with their better halves. They will be in better condition physically and mentally to again take up the work.

Next in order of the Chairman's responsibilities, is to see that the Institutes are well advertised. A good way to get your local newspapers interested is, occasionally, during the entire year, to give them agricultural matter for publication, so that when Institute time arrives, they will gladly publish all Institute news you may have for them.

And, last but not least, of the County Chairman's responsibilities is, that he should not shirk any of the duties connected with the position, but attend as many of the sessions as possible. If such County Chairman has already served a number of years, he will be known by many people, and a personal acquaintance with many of them will have been informed, so that they feel more at home in his presence than with a stranger, substitute, or a too-forward neighbor.

In fact, any person placed in the position of County Chairman of Farmers' Institutes and who conscientiously intends to assume its responsibilities, so as to "make good," as the saying is, must be "on the job."

The CHAIRMAN: The next subject will be responded to by a gentlemen who can boast of conducting Institutes at which there was a greater attendance, during the past two years, than in any other county in the State of Pennsylvania. I will tell you something about it. Last year, at a little town, known as Red Lion, there came to that Institute one delegation in a wagon loaded up with 132 people. They drove six miles with a six mule team and spent three days at that Institute before they went home. I take pleasure in introducing Mr. G. F. Barnes, of York county.

## 4. ADVERTISING: HOW BEST CONDUCTED

By G. F. BARNES, *Rossville, Pa.*

Mr. Chairman, Ladies and Gentlemen: I notice that Mr. Hutchison has a bouquet this morning and I suppose the Deputy Secretary intended to throw one at me.

The question of advertising Institutes is one which is of vital importance to every County Chairman in Pennsylvania. It is one that has appealed to me as being essential to the success of the Institutes. The method that I have used in York county has proven very satisfactory. First, I get in touch with the public press, and from the time the Institutes are located, which is, as you all know, the second Tuesday in June, I have the newspaper reporters keep the Farmers' Institute matter before the eyes of their readers continually, and it appears in their columns free of charge as an item of news, and they are only too glad to give us this advertising. They make a complete statement of the meetings, telling what the purposes of the meetings are and what subjects are to be discussed, all subjects pertaining to the advancement of agricultural interests. The first year I called on the editors of our county papers and explained to them the intention of advertising, how much it would be appreciated by their readers; and they immediately saw that it was to their advantage, as well as to the advantage of the farmer, and they gave us advertising and gave it free of charge.

When I have copies of the program ready to go to press, I usually give it to some little paper that probably only does job work or something of that kind; probably I have a little county paper or weekly paper do it; but the daily papers never get the printing of that program. I never do anything to create any jealousy between them. I send a copy of each of those programs, typewritten, to the editors of all the county papers. They copy this in the columns of their papers at least two or three times a week from that date on till within a week of the time the Institute convenes. At that time they place as one of the headlines, in rather large print, a heading suitable to attract the attention of every farmer in the county, and under that they print the complete program day after day on up till the morning of the Institute, when they drop all the programs, with the exception of the one for the two days following , and in that way they continue day after day, as our Institute progresses during the week or ten days that we have Institutes in our county.

After this is done, they send with us two of their reporters, reporters from each of the county daily papers, to write up the proceedings very extensively, and they not only do this at their own expense, but they also authorize these reporters to offer prizes for the best specimens of corn, potatoes or other commodities that have been actually grown on the farms in the county. This has aroused the business men of different places in sections where we held Institutes to such an extent, that last year, at the Farmers' Institute in York county we gave away prizes to the amount of over four hundred dollars, all of them being contributed without any expense to myself or the Department, as Mr. Martin knows. The public press is the best advertisement that I have met or have used in advertising Institutes in our county, from the fact that they reach more people than our posters or anything else can possibly reach. We have a number of posters sent out by the Department, which I also take to a local printer and have him insert the names of the lecturers, also their postoffice addresses and the date of the Institute at a certain point, and they are distributed within a radius of eight or ten miles of all sides of the place of holding the Institute, at least about twenty days prior to the Institute.

This is about the method we have been using. When I took charge of the Institutes about nine years ago, the total attendance in York county was 800. As Mr. Martin and Prof. Menges, as well, have referred to it, I think our attendance last year was in the neighborhood of 11,000. I do not attribute any of this to the actual work of myself; I really give the honors of this part of the work to the public press of our county; the York Gazette and the Daily have done more for Farmers' Institutes in York county than any other one individual would be able to do in twenty years.

This matter of advertising, some may say, sounds very nice when you talk from your point of view; but when worked out in our county we cannot get the editors to consent to do this without being paid for it. That may be true in some cases, but I would say to that County Chairman, "You go home and take your editor by the hand, sit down and talk the matter over with him, and on the second Tuesday of June, ask him to send a reporter to your meeting and follow that reporter back to that newspaper office and say, 'Now we have located the Institutes and your reporter has taken the notes and we ask you to do this as a matter of business both in the interest of the farmer and yourself.' "

We have had in our county the business men to come in to it and they have all agreed that the success of the farmer is the foundation of their prosperity, and they have come to the meeting the second Tuesday in June, demanding Institutes in places where almost everybody would be supposed to be connected with their manufacturing shops, and at one point, within a mile and a half of my home, we had an Institute last winter, the first for fifteen or sixteen years, that we had at the opening session in the neighborhood of six hundred people, and the majority of them were farmers and their families. Now, these business men requested this meeting from the fact that they felt an interest in the farmers and wanted better farming in the section where their factories were located, and at the opening session of the Red Lion Institute. which has been referred to—it was the winter before—and at the one this last winter we had over a thousand people at the opening of the first session. We had to secure a second hall and had both filled to the doors and were favored with the best weather during the two days we were there. I do not wish to take any more of your valuable time in this matter, but if you will try some of these little suggestions, I think they will work out very satisfactorily in your county. Other people tried it and they have come to me and told me, "We have tried to follow your advice and it works out very successfully in our county."

The CHAIRMAN: I have received word that at two o'cloack this afternoon's session will convene, when the Governor of the State, Senator Penrose, and, I am informed, a representative of the Good Roads Commission of the State will be present, and Mr. Jones, of "Dirt Road" fame will also be present, when the Good Roads Session will be held. You are all invited back at two o'clock for that session. Keep that in mind. Those who are not interested in this discussion may retire now, so that we may continue until twelve o'clock.

The SECRETARY: I only arose to ask you to make that announcement. Everybody who don't have to go will stay right here.

A Member: I am a newspaper man myself; we publish the Ohio Farmer, and I wish to emphasize the importance of the fact that people should not stop with the insertion of one advertisement, and I don't believe it is wise to confine the advertisement to one medium. I think Mr. Barnes has exactly the right idea in not confining his advertiseing to one medium, the newspapers, but also to use the poster. You have got to see an advertisement a number to times before you read it; somebody has figured it out that it takes seventeen looks. I don't believe it takes that many, but if you have these posters and have your program well published and print little stories from time to time about the people who are going to appear to make talks about what is going to happen, you cannot help stirring up interest in your Institute and having the interest; you are bound to have a good attendance and a good program, because a good attendance will stir up enthusiasm on the part of the speakers who are to appear.

The CHAIRMAN: Next on the program is, "Preparing Programs; When and How," by W. F. Biddle, Everett, Pa.

## 5. PREPARING PROGRAMS; WHEN AND HOW

By W. F. BIDDLE, *Everett, Pa.*

Mr. Chairman: Eight weeks prior to the time when my Institute convenes, I commence to prepare my program by writing to the Chairmen of the different local committees in the vicinity where my Institutes are to be held, and tell them to get together, see their neighbors, and arrange for the topics they want discussed in their immediate neighborhood. I give them about three weeks, so that they can get their thoughts well together and discuss the different topics they want that are applicable to the community in which they live, because they are better acquainted with that than I am, and then they report to me and I get the programs to the printers and they have to print them in a very artistic manner, if possible.

Last year, Mr. Martin will observe, if he remembers, the party that was to print the programs, their press broke down and they got a neighboring printer to print them, and I made a big objection; in fact, I didn't want to pay them for the programs at all. I like a little basket of flowers, or a few apples, or something like that on the programs. Brother Campbell can remember what looking things those were. I like something like that that will be artistic and I generally have them on my programs, and I have the Ladies' Session, and always try to have some ladies on the program, if we can arrange to do it; but in our county we cannot often get a lady to take part in the program; it is a hard thing to do. I don't believe that if we had woman's suffrage you could get any of the women in Bedford county to go out and vote, because they don't like to appear in public; but we generally have topics discussed there that are applicable to the home and to the farm, and the second night we have the Women's Session on the program, and I don't know, but sometimes believe that we ought to have a Boys' and Girls' Session, some time when we have our Institute. I believe it would be a good thing. I haven't tried it, but I don't know but what I will try it another year—have a Boys' and Girls' Session.

Now I don't know that I can add anything more to that, only, I have been thinking this winter of arranging my programs in a different way, the same as we did for our Fruit Growers' Association.

In our county, for the last two years, I have been arranging the program for that Association, and I only put the program of one session on one page; the balance of that page is devoted to notes for that session, so that each one that has a program has a notebook, and he can take the notes of that session down on that program. Now, I have been thinking of arranging my programs this year about two and one-half inches wide by four inches long. I can use one-third of that space for the program of that session, and the party that holds that program can take their notes and put them right down below that, and when the session is over, he can stick the program in his vest pocket or coat pocket and take it to his home in the evening and he has got that same notebook with him. I don't know but what that would be a very good plan in arranging programs, and I always then get my programs out of my people about two weeks before the Institute is to be held. I don't like to get them out too long in advance, because they will be thrown away and wasted; but I generally like to have my programs put in the papers, two insertions, two weeks prior to the Institute. I think that is all that I have to say on preparing programs.

MR. McGOWAN: I would like to ask, how many programs do you get out of the two days' Institute and what do they cost?

MR. BIDDLE: Well, under the present system, I have what we call a leaflet printed for our county. We had four days this last year. I hope Mr. Martin will give us eight next year; and I have about three or four hundred printed and they generally try to charge me about three or four dollars. That looks like a very small amount, but I think it is sufficient for us.

The CHAIRMAN: Next on the program is, "Local Institute Expenses," by Mr. J. E. Hildebrant, of Dallas, Pa.

## 6. LOCAL INSTITUTE EXPENSES

By J. E. HILDEBRANT, *Dallas, Pa.*

Mr. Chairman, Ladies and Gentlemen: In the matter of Institute expenses, as we County Chairmen all know, we have to do some missionary work in reference to it, and I think it is far better that we should, and there's lots of things we could pay for and some things we should, which, I think, would be detrimental to us in the interest of our Institute. We think we pay liberally for such things as we need and such things as we should. We do not wish to be burden bearers.

We start out with the rent. We try to get our Institutes in churches if we can. I think that is the proper place to hold an Institute; you get the respect of the people that come; the audiences behave better; some, that don't come for any good, will not come to churches. You have the minister with you; you have the music with you, which we used to have to pay for, and that one thing made our expenses run up years ago. We don't have to pay any more by having it in the church and in the Grange. We work through the church and through the Grange a good deal to get our help for the Institutes and keep down our expenses, and when we meet, the second Tuesday in June, anyone that is not willing to furnish a hall or church at a reasonable price, why, of course, we take it that they don't need an Institute.

In our county, we think we have a hard county, like Washington,—it's hard to get the people interested, because ours is in the anthracite coal region and our farms are scattered and so many of them have to go to market on certain days and their interest runs in different ways, and it makes your expenses greater to make a success of our Institute. We pay five dollars a day for either a church or a hall. We think the church should have the pay as well as the hall and we want to pay our expenses for the coal and lights.

A Member: Do you mean five dollars a day for the two days?

MR. HILDEBRANT: Five dollars for one day. We have six days of the Institute and that runs us thirty dollars and the janitor at one place was paid two dollars. We have the six days, as I have said; then we have our programs printed.

The matter of programs has just been before us, and here is a program we have printed. The gentleman said he would like to have something on it. Here we have the picture of a cow's head, and poultry, and cattle, and we have it amply large, so that on the other side you can take notes. It advertises the whole six days. For these we pay six to seven dollars a thousand. Of course, we pay for transportation from one place to the other. We don't go to the livery stable, because this is for the farmers, and if we can get a farmer that's got a good rig and team, he is the man we get and we pay him for it. He is entitled to pay for it, and this cost us, in our county last year, $11.50. My personal hotel expenses were $7.60 and my carfare traveling around to different parts of the county from one place to another—over 35 miles—was $2.70, and my postage and telegraph expenses were $1.13. Is there anything I have not covered of the expenses we should pay? That totals $61.20 or $10.20 a day, which, I think, is ample, and I don't see why we should spend more, and we get good results from it.

MR. SEEDS: I don't want to talk because I like to, but I would like to say a word because I think it is necessary.

The CHAIRMAN: Speak right out, Mr. Seeds.

MR. SEEDS: I know the County Chairmen of this State have all they can do, maybe, and do it for nothing, and they have treated me like a gentleman. As I travel over the State I have a warm heart for them, and I am not trying to find fault, because I don't like to, but last winter—talking about advertising the Farmers' Institutes—last winter I went to two towns; one of the towns I went to, I had the program in my suitcase and had the name of the hall where the Institute was to be held, and I didn't want to open the suitcase to get it out. I traveled up through that town and I could not find a man in there who could tell me where the Institute was to be held. At last I had to open my grip and take out the program and find the name of the hall where the Institute was being held. I did that last winter in two towns. I know that in a small town it is different, but in a town of six or seven thousand people, where business is conducted, you have got to do something to get the people to know it. The trouble in those towns was that the people didn't know the Institute was being held there. There ought to be some way of having the people know there is an Institute being held in that town.

Now, this is just one thing I don't think is altogether right, and maybe the County Chairmen have all they can do, but the people surely ought to know there is an Institute being held in the community. If you'd make a hobby out of it everybody would know it. A man never had a hobby in the world that everybody didn't know he had that hobby. A man one time was going to college and never made a speech that he didn't use Patrick Henry's address about "Give me liberty or give me death." He used it every time he made a speech and his college chums thought they would get him in a place where he couldn't use that assertion. So they got him in a debate in their college, on the question, "Resolved, that colic in the horse is incurable," and they put this fellow on the affirmative side and the debate started and he said to the judges, after he had presented his argument, "Colic in a horse is nothing more or less than confined air in the stomach, crying out, 'Give me liberty or give me death.' "

MR. HILDEBRANT: We don't advertise in our county, but we advertise in five of the county papers and we also have it posted all around. I don't think Mr. Seeds meant this for our county. And we tried to get the ladies interested and any lady or child can tell you where the Institute is held.

MR. JOEL A. HERR: Are we going to have further discussions on the same questions, or is this the sum total of it? If it is, I don't think the intention of this session is being carried out. We have had very little talk on some very important questions and this last question of the expenses of our County Institutes and the matter of managing them within the minimum rate of expense, is a very important question and ought to be further discussed.

The CHAIRMAN: Well, go ahead and discuss it, Brother Herr.

MR. JOEL A. HERR: I am glad to talk a little about it, but I want to tell you that sometimes our notions are entirely upset. We expected to do this this afternoon. In my grip I had my account and I would like to present it to the Institute, showing exactly how I keep my accounts. I have been keeping accounts for a good many years, and I have presided at as many Institutes in our county as any other member present, being a little older, unfortunately; but I want to tell you that the County Institute man, to start with, must be a representative man who knows the people and has an influence in the county in which he lives. If he hasn't, he'd better get out of the position and let somebody else have it. It is important on account of the influence he has in securing places to meet, in securing people to work, the respect he commands and the confidence that the people have in his honesty and integrity and the ability he has got to handle the audience.

I believe, in this important matter of expense, it is well to establish a sort of precedent; for instance, don't give more than a certain amount for the use of a hall. If a party comes to me and says, "We want the Institute in our community, but we cannot get a hall for less than ten dollars," or, perhaps, "We can't get a hall for less than twenty dollars," I will say, "You don't want it very bad; we will hold the Institute if you say so, but we will give you five dollars for the hall and if you like the Institute well enough, you can pay the other fifteen." Generally we have it in a church, but we give them to understand that, "We are bringing that Institute to you entirely clear of expense; you are not expected to board us or lodge us or anything else. It is entirely free and money in your pocket. If you cannot afford to furnish a place to meet in, we will go where they can." There's always lot of places waiting with churches that are not too expensive. If you establish a precedent and say, "I am going to give this church twenty dollars," the very next church will say, "We are just as good and need it just as much as that church and we want twenty dollars."

We cannot afford to do it. I want to say to you that I conducted last year six day Institutes in our county. I had livery hire, and we paid all our expenses and instead of getting $75, we only put in a bill of $47 or $48; that was all we needed. We had good Institutes, successful Institutes, and all our expenses were met. I believe in a little management in advence. We can largely curtail our expenses and have more attendance. I guarantee that if Mr. Martin will allow the State speaker to stay in my county for eight days, I will take the six-day allowance he gives me and hold the Institute for eight days and pay all the expenses. It can be done, but it has to be done by some thoughtfulness, some influence and some action all over the county—your influence with the strongest people and people of the neighborhood; if you get them interested in it. That is only one feature of the Chairman's work.

The Chairman's work is very important. There are a great many new Chairmen and some, perhaps, never prepared programs. It is very important that we have programs properly prepared and everything done in order and I think half an hour could be profitably spent in comparing experiences in that line.

MRS. FOULKE: I suffered a litle bit from going to towns where the Institute has not been properly advertised. In the first place, you put the poster on and it won't stay up; they are not up twenty-four hours after they are posted; they are not put up in a properly protected place. I have seen numbers that were turned down, just hanging. Then they ought to be of a more attractive design. I know a little about that, because I have advertised and worked up all sorts of things for my home County hospital. I have been on the board there and so I have been interested in county work and we advertise that largely. Your posters are not catchy; people won't read them; it may be a tax advertisement and we all avoid those,—we don't see them if we don't have to. The posters are ordinary posters and nobody reads them unless they are specially interested in them. It seems to me it would be a good idea if the County Chairmen, before they locate their Institutes, would find out whether the people wanted them. I have been to some places where we were not wanted. I know that we were not wanted, because the people didn't come. If you are advertised by your loving friends they would get up and talk about it. If the County Chairmen would find out where we are wanted, then we would be already advertised, and I think the programs ought to be more interesting. They are very stupid, as a general rule,—just a list of names and what we are going to talk about. They might be quite business-like and very much more interesting.

A Member: Mr. Herr stated that he thought five dollars was enough for the use of a church. A church is a particular home for particular people and they have to bear all the expense for the maintenance of that church. The whole countryside will gather there and whatever wear and tear is connected with it must be borne by the particular people of that church. I do not believe that five dollars is enough to reimburse that particular church organization for the use of their building by the whole community.

MR. JOEL A. HERR: We are not going to pay for the church, we don't propose to. We are not here to contribute to a church, we are here to pay for the light and fuel we consume, so we don't leave you any poorer than we found you. If you want to contribute to a church, do it, give them just as much as you want to, the opportunity is open to you. We furnish the entertainment and that will entertain you sufficiently to pay for the use of your church.

The CHAIRMAN: We have one more subject on this program, "Should County Chairmen Attend all Their Institutes?" by Mr. J. H. Schultz, of Norristown, Pa. Mr. Schultz will please come forward.

## 7. SHOULD COUNTY CHAIRMEN ATTEND ALL THEIR INSTITUTES

By J. H. SCHULTZ, *Norristown, Pa.*

Mr. Chairman, Ladies and Gentlemen: It is a hard matter to talk to hungry people and it is very discouraging to talk to a half filled hall. But I have some things to say and I want to say them in a few words and be done with it, and then we will all go and eat.

The subject as asigned to me is, "Should County Chairmen Preside at the Farmers' Institutes?" I was surprised when Mr. Martin informed me that I was to talk on that subject. I took it for granted that every County Chairman presided at the County meeting, but I believe such it not the fact. I believe most positively that he ought to and if he is not competent to preside at the meeting, he isn't fit to hold the position and somebody else ought to be appointed, because I believe that the County Chairman holds the same position over his county that the successful farmer does over his farm. The County Chairman ought to be acquainted with the conditions in his county, he ought to know the workings of his people and those things ought to be strengthened, and unless he is in touch with his people, how can he hold a successful Institute?

What a successful farmer wants to do is to make the poorest part of his farm as productive as the richest part of it, and that is the successful farmer. That is what we are attempting to do. If Montgomery county wants to raise more corn than anything else, if our farmers have their corn cribs full of corn, they don't need to care much about the high cost of living, they can make money. But in order to do that, in order to get them interested more and enable them to raise more corn and better corn, I get out a paper to offer prizes at the different Institutes. And right there is a point I was tempted a bit ago to take up when you were talking about those trailers. I made use of those trailers, the newspaper men, if you please. They came to our first Institute, and as the people came in the hall and sat down before the meeting opened, they got to talking, neighbor to neighbor, in a social way, and those men came in, they thought their business was the most important, and they just stopped those people from their conversation with each other and thought that they had to sell them a paper right then and there. I was surprised. I stepped up and just told them where I thought their place was and they took it good naturedly and we had no trouble, and afterwards I went to them— we offered prizes, as I told you, for corn exhibits, corn prizes,—and got them to offer their newspapers for the third, fourth or fifth prize, and then the competition came in between the newspaper men. For instance, one man offered free subscription for the fourth or fifth prize; the next man thought he would get ahead of that fellow and offered two subscriptions for the sixth prize, and so we had them going. They didn't annoy us. We simply told them where we thought their place was. I don't think it is a bad thing to have them, but the Chairman ought to be boss of the proposition and certainly ought to preside. There is no question about it. The Chairman ought to know the workings of his people, and if he is Chairman, he can control their discussion and bring the weak points out that a farmer needs so badly, and those are generally the points that a farmer is not concerned about.

The trouble with our people is, and with the farmer as a whole is, that he is contented, satisfied with his condition. That is the most pitiable condition a man can get in. I want a man to be dissatisfied and want to do better than ever before, and unless you get that condition you will never improve, and the County Chairman can see exactly in what points the farmer is lacking and the County Chairman ought to be a practical farmer himself; there is no question about that; if he isn't, he cannot be a successful man in his position.

SECRETARY CRITCHFIELD: Just in a word, I want to say, I agree with pretty nearly all that was said by the gentleman who has just left the floor, and yet we must all remember, there are some very good business men, some good organizers ,men who can do the work of the County Manager, who will not make very good presiding officers. There are some men who will lose their heads as soon as they get into the chair and in cases of that kind I think it would be better if the County manager would select the very best man he can for Chairman and let him preside.

To illustrate, some years ago, at one of the Institutes, I will not name the county, but it was in the western part of the State,—the Chairman was just the kind of a man I am speaking of, a man who was competent, a man who could arrange a program, but when he got up before the people, occupying the Chair, he would lose his head and he made a statement of this kind: He said: "The next performance will be, Mr. Herr will speak a piece from Clinton county."

MR. SCHULTZ: I think I must tell you my experience this year at one of my Institutes, and I think that will strengthen my argument, but the point is this, if a Chairman does not preside at his meetings, he may possibly not be at the meeting at all and he may get just a little bit careless. What would have happened at one of my meetings this year if I had not been there and known I was within my rights and was boss of the job? Possibly this is not to the credit of Montgomery county, I don't think it is.

The CHAIRMAN: Montgomery county is all right.

MR. SCHULTZ: I believe we had the most successful Institute ever held in Montgomery county, this year; but for what happened at one of our meetings—it was at Salfordville. We opened the meeting Saturday afternoon at 1:30 and one of the speakers was on the platform and talking on poultry, and a man came in and he was none too steady. He was a hotel proprietor from a neighboring town and he came there with the purpose to get the Institute at his place next year, but he was intoxicated and came in the audience and sat about half way back in the hall and wanted to talk to everybody around him and reached over and touched the ladies and made remarks about the speaker and all that, and the speaker's talk didn't do any good. A farmer asked a question and he chipped in. The hotel man at the place where the Institute was held was in the audience, too, the proprietor of the hotel, and I went right down to him and says, "This is no credit to you; you get that man out of this audience." He raised his hand and says, "I'm afraid of that man; he's a beast, you don't know him." I didn't know what to do. I went back on the platform and there was the Chairman of the local meeting and I told him to go down and get that man out, or this meeting can't go on. Says he, "I live near that man's home and I would be afraid to go to Schwenksville if I did that, he'd shoot me." Then I went to the Squire and I told him, "Squire, this is a local proposition, this is up to you, you get this man out. You are the proper man." "Oh," he said, "in the position I hold I wouldn't care to do it." He was on the floor talking and I told him to take a seat and then I got up and told the audience that unless we could have order at once I would adjourn the meeting right then and there. Of course, I made the remark about this man disturbing it and he jumped up and talked till everything was blue; he swore—well, I don't think I ever heard a man swear worse than he did, and worked himself into such a rage that he went right out of the room, but before he went out he turned and gave me another shot. But suppose there would have been a man that didn't feel that he was positive about his position; would he have taken those steps? I doubt it.

The SECRETARY: Well, Mr. Chairman, I think that the positiveness of the Chairman about his position was due to the fact that they are not all as big as Mr. Schultz.

A Member: If I had been there I'd have thrown him out head over heels.

PROF. MENGES: Just a minute in regard to this matter of advertising; I am not satisfied with that part of the discussion here this morning. I have had some experience—

The CHAIRMAN: Just wait a moment till I say something. You see we have placed here General Discussion to follow this Session. Now, we are all interested in this. Wouldn't it be well if we should adjourn now and get our dinner, and before the Night Session, or even before the Afternoon Session, come back here and have a general discussion?

MR. HUTCHISON: I move that we adjourn till half past one; that will give us half an hour before the other Session.

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Washington, Pa., May 22, 1913, 1.30 P. M.

Director Martin in the Chair.

The CHAIRMAN: The question of pay for the County Chairmen is one of the most important subjects we are considering, and I should be pleased to have a free and open expression from the different County Chairmen as to their desire upon that point, for my action will be governed by the reasonableness of their desire.

MR. WOODSIDE: I have to hire a man to do my work while I am away, but the State is not allowed to grant us anything for that expense; and while I receive some benefit from it, I, for one, feel that we should be paid for our time so that we are not at a loss financially when we are away from home.

MR. SHUEY: I said something on this question last year and I will say it again, as this man behind me has remarked, that it is always a loss to every County Chairman, the time he loses and not getting anything for it. But as far as that goes, if the Agricultural Department hasn't provision enough to pay the County Chairmen, I would not ask for it to hinder the work of the Department. I am always in favor of making improvements, and if this should be in the way of agriculture to make advancement, I would say, keep on this way. But if the way is clear, I should say, give the County Chairmen a small pay for their services.

MR. CRITTENDEN: I would like to ask this question: Does anyone in any way connected with the Institute force, work without pay, except the County Chairman?

The CHAIRMAN: I know of no one who works without pay except the County Chairman and his Committees. I know of no set of men who perform a greater amount of disinterested labor for the cause of agriculture than these men, yet I am not clear that we would engage better services were these ment to be dropped from the work, and some fellow that wanted two or three dollars a day taken up. I want you to think about that. What do you think about it? What is your reasoning on this subject? **Sometimes we are** led to believe that the school directors of Pennsylvania perform a great, disinterested work for education without pay, and it does not seem exactly just; neither does this. You gentlemen who are interested, discuss that point and come to some conclusion. Whatever your conclusion, it will meet with my hearty approval.

A Member: I am willing to put in my time and work along these lines, but I don't like to do it at a loss.

SECRETARY CRITCHFIELD: In further answer to the question of the gentleman over there, I would like to say that the members of the State Board of Agriculture perform the services that they undertake for the State out of patriotic motives entirely; they do their work without any pay; their expenses are paid and that is all. They attend the regular meetings of the State Board. Some of them are appointed on committees that require them to spend a good deal of time in collecting data for the reports they must make, and those reports constitute a very important part of our agricultural literature. Whatever these men are doing in connection with the Institute and in connection with the work that is being carried forward in the interest of agriculture in the State, is done without pay, except that their expenses are paid.

MR. BOND: For more than ten years after the first Institute was established in Pennsylvania, the entire force rendered all their services for nothing. My friend Critchfield and I traveled clear across this State for nothing but our actual expenses, year after year, and a number of others have done the same thing. We were not able to give the service these scientific men can give now, but we gave the best there was then. People expected it and our Institutes have grown from that foundation.

MR. J. M. DERR: I have been associated with school work and school directors for a period of twenty-four or twenty-five years, and we run across school directors that think they ought to be paid for their services. I am of the opinion that as long as we can have school directors to serve without pay, we will probably have a better class of directors than those who receive compensation. I also feel that as long as we can get County Chairmen to work without pay, we will have a better class of County Chairmen than if they receive compensation for it. I feel as though the County Chairman ought to serve without pay.

MR. G. F. BARNES: I suppose there's but one or two counties in Pennsylvania where the Chairman spends more of his time away from his home and business at Institutes than I do. In our county we have a number of Institutes and it takes some time. I have never begrudged a minute of the time I spent attending the Farmers' Institutes in our county. It has been profitable to me, even if I did pay a man a fair per diem pay for rendering the services in my home while I was absent; and just as soon as you put a per diem pay on the Chairmen of the Farmers' Institutes of Pennsylvania, just so soon will you cripple the interests of agriculture and bring about a class of men, no doubt, that take little interest in matters of agriculture and serve as Chairmen from the fact that they have been designated as Chairmen and are drawing the per diem pay for their services. I, for one, am willing to contribute my time in the future as in the past, and I think we ought to be willing to accept the same proposition.

MR. BOND: You don't want a dollar mark stamped on you.

MR. STEWART: I have just learned what the question is under discussion. If I understand it, the question is whether or not we County Chairmen should receive compensation for our time devoted to this work. I want to say to you that I would not accept any compensation if you'd give it to me, because I am convinced of the fact that my work, my influence, my power, would be weakened. I want to tell you that I believe it is more honor these days for a man to serve his fellow-men, particularly his fellow-farmers, without compensation, than it is for the highest paid officer in the State of Pennsylvania, who gets the largest salary and does the least service. I do think that a good rule in Pennsylvania would be, less salary for services and more stars in a man's crown.

The CHAIRMAN: Any other gentleman: Any other subject that you desire to discuss? You will remember, gentlemen, that we were discussing a great many uestions this forenoon very hurriedly and we have this little time to expend. I might read the questions presented in this program to stimulate your thoughts just a little: "County Organization of Institutė Committees," "Responsibilities of County Chairmen," "Advertising; How Best Conducted," "Preparing Programs; When and How," "Local Institute Expenses," "Should County Chairmen Attend All Their Institutes?" "Which is Preferable, Written or Oral Questions?" These are the questions we were discussing this forenoon.

MR. BLYHOLDER: The question of attending the Institutes, I would say, has not been very much touched upon, and it has been hinted here that some of the County Chairmen arrange with their local committee to select the chairman. Now I have been for fifteen years occupying the position. It was my practice for a number of years to select local chairmen, but my experience led me to this, that if I could not fill that position as well or better with the experience that I had, and ought to know the needs of the various communities and of the farmers, I ought certainly to be able to fill that position better than the one selected from the college who had no experience. I say that a Chairman who has had several years of experience ought to know, when he faces his audience as the first speaker, how to direct that Institute to make a success. Therefore, Mr. Chairman, the County Chairman, if it is possible, should attend every meeting of the Institute in his county.

And now as to the responsibility that has caused more thought in my mind as to my duty than any other part of the question. When we attend these Institute meetings, like this one, which is the round-up, we are warned of the greatness of our profession as farmers and the responsibilities that rest upon us as citizens—as farmers and citizens—the responsibilities that rest upon us because of the rising generation. We are told that upon the children of the farmer depends the future of this country and I believe it. Therefore, I say, Mr. Chairman, that the responsibility that rests upon the County Chairman is a great responsibility, because upon him rests the responsibility of directing the speeches and the thoughts and lines that are to be presented to the rising generation in his district, and a man that has a responsibility like that ought to be studied by every Chairman, because his fitness has a great deal to do with his success. I have been at Institutes, Mr. Chairman, where the thoughts of the children, I think, have been drawn from the proper channels and not in the direction they should have been, so that I say, the responsibility that rests upon the Chairman of guiding the future is a great one and a question that ought to be discussed here more liberally than it is.

The CHAIRMAN: We have about ten minutes yet.

PROF. MENGES: I referred this morning to the advertising of Institutes. I don't think that that matter has been discussed as fully as it should have been. I know very well that I haven't time to discuss it, but I would suggest that the Chair appoint a Committee of County Chairmen to work out a plan of advertising the County Institutes so that the farmer may know when and where they are held, what subjects will be discussed, who the speakers are and what the Institute is intended to do. I say I believe it would be a good plan to work out a method of advertising these Institutes thoroughly. Mr. Seeds said this morning that he got into a town some time ago and nobody knew that there was an Institute to be held there, and I have had similar experiences, and I believe there are other men here who could verify what I have said.

MR. SHUEY: As soon as you get into the larger towns, the people don't bother themselves. If you have it advertised in all the papers, they don't look at it, and when you ask them, they don't know anything about the Farmers' Institute. What's the reason? Those men go to the wrong people to inquire. If you go outside the large towns and in the little towns, everybody knows where the Institute is to be held. In regard to advertising, I found out in our county that some of our local chairmen had an idea that we should get postal cards and send a card to every individual farmer to get them all there, but I find that we won't get any more there that way than we do by putting up posters and advertising the whole program in the paper. In some places it may be all right to notify every person by postal card, individually, but it didn't do in Lebanon county.

MR. BLACK (of Westmoreland county): I am one of the has-been superintendents of divisions. I am out now, but I want to state a fact that has taken place in our county and that is this: We came to the conclusion, after talking the matter all over as to the best method of advertising the Institute, to get the people to all know it, and we spent a few dollars in some printing, and every member of the Committee suggested certain farmers all over the community, they know them all, they knew all the farmers in the community, and those were the people we were after. We sent each one a copy of the program, names and everything connected with it, and, my friend, it would be surprising to find out the number of people that came in and attended the Institute. They all knew about it, and to this day, Mr. Chairman. I want to tell you that there has not been an Institute held in our county that the attendance is to great as that. They all come in; they all seem to know about it. As to advertising it in the local papers. that is all right, it is all very true, but you would be surprised to find out the number of people that don't read even the local papers at all. Send a notice direct to them and you will get them all interested and they will all be there.

MR. KESTER (of Clearfield county): I want to emphasize the fact that the program is the best advertisement of the Institute; and yet I should say, on an estimate, that one-half the places where the Institute is held in the State, the programs are opened for the first time in the first session of the Institute. I believe in their general distribution through the public schools and otherwise throughout the community.

MR. M. M. NAGINEY: It has been the custom in my county to distribute the programs a short time after they were printed, send them all over the county and to public school buildings and also send postal cards.

The SECRETARY: I would like to suggest that in connection with the programs being sent out in advance, which I regard as a very excellent method of advertising, it is a good thing to have some of the local people in every community where the Institute is to be held, on the program. Great care must be taken by the Institute Manager to get the right people. He ought to get over into that neighborhood. My own method, when I conduct the Institutes in the county from which I come, was to call a meeting of the people in the community where the Institute was to be held, in advance, and then talk the matter over with them and have them appoint their committee, and one of the duties of the committee was to suggest persons from that neighborhood who were to take a place on the program. If you send out your program in advance and have named several persons of the immediate community in which the Institute is to be held, as persons who are to take part in the discussions, who have a place on the program, their neighbors will be anxious to hear what they have to say. Mr. Smith will say, "I am going to the Institute because I want to know what Brown is going to say on the subject that is assigned to him." In some instances they will think that the wrong fellow has been put on the program and they would have been able to do that matter much better themselves and will come many times out of curiosity, but what you want to do is to get the people there.

My own thought is, that one of the effective means that can be employed in getting the people there is to have some of their own neighbors on the program. I had charge of the first Institute that was held in my county and I was pretty well acquainted with the people of the county, having been County Superintendent some years before that, and I made it a point to go out into the different sections of the county and select farmers and farmers' wives who were teachers years before when I was County Superintendent, and get them to take a place on the program, and I sent the program out in advance, and some of the men who are living today, who, as Mr. Bond has said, come way across the State without anything except their expenses, feel that if the Institute shall not be like a bumble bee, largest at its birth, we are certainly going to have a very great success with Institute work in our county. We had a full meeting. We had the large court house and there was a pretty long standing room, and I think the reason was because the program was largely made up of our own people in dicerent sections of the county.

The CHAIRMAN: The only other thing we can do is to draft a system, to be presented to our next meeting, of the best method of advertising the Farmers' Institute.

(It was moved and carried that such a system be drawn up and presented).

The CHAIRMAN: We will take that under consideration and have that committee appointed. If the audience will be patient, the Good Roads Session will commence within a very few minutes.

(Governor Tener, Senator Penrose and others then arrived and Mr. G. G. Hutchison took the Chair).

## GOOD ROADS SESSION

Mr. G. G. Hutchison, Chairman.

The CHAIRMAN: My friends, you will please give attention and we will begin the afternoon session. It is not often that a farmer is called upon to preside over a meeting with gentlemen as distinguished and well and widely known as we have here this afternoon. It is not often that one is called upon to introduce so many distinguished men of our State and Nation; but I will ask your forbearance and I will try and do the best I can.

The first gentleman I have the honor to introduce to you to-day is a native of your own county, born in County Tyrone, Ireland, who came to this country with his parents and commenced to hew out life in America. I tell you what it is, my friends, it must be a matter of pride to any man that starts as a worker in a mill, as a clerk in an office, and following that, as a baseball player, and going from that to Congress, and then in a banking institution, then going out from you to become Governor of this Commonwealth.

One thing I can say, that the first thing he did was to get acquainted with this great State, and especially with the agricultural interests of the State. I remember well when he first visited State College, the place of the meeting, the foundation of our educational interests in agriculture, and how he stood up for that College and placed us to-day in the front rank. He has never turned his back on the Department of Agriculture, nor on any bill that came up that was for the interests of agriculture; but the great subject that lies near his heart and his mind was that of building a road system over this great State of ours.

And he has begun, and he is working with might and main, though no man has ever started on any big enterprise but has been criticised, yet he is here as a man to stand on his feet and meet any criticism, and the day will come, after he has retired to private life, when his name will be blessed from one end of this Commonwealth to the other for founding a road system that is not excelled by that of any of the Commonwealths of the United States. (Applause) It is with great pleasure that I present to you your fellow citizen, your neighbor, your friend, Governor Tener, who will now address you. (Applause).

## ADDRESS OF GOVERNOR TENER

Mr. Chairman, Ladies and Gentlemen and my Fellow Citizens: To be invited even to be present at such a gathering as this, held on the part of the Commonwealth of Pennsylvania, would indeed be an honor; but I deem it a special privilege and the greatest pleasure to come here into my own county and meet with you this afternoon.

I realize that many speakers, nearly all of them, if they can, endeavor to connect themselves with whatever movement your meeting has for its purpose, and I would like to say to you, in truth, that I ever was a farmer or that I am a farmer. The fact is that I have never been a farmer and am not a farmer to-day; and yet, coming and going about our great Commonwealth, from Wayne to Greene and from Erie to Delaware counties, I can appreciate, I think, as much as anyone, though they be farmers, the importance of the great agricultural interests of this splendid Commonwealth of ours. And so as early as the Convention did me the honor to give me the nomination for Chief Executive of this State, I asked just one thing, that just one thing be put into our platform and that adhered to, and that was, a commitment for a State wide road improvement, a system that would connect all our county seats in one great comprehensive system; that those roads, so to be built, should be built and ever after maintained by the State. To that end this administration has labored and has not been laboring in vain.

I presume in your meetings up to this moment you have talked of roads as well as other subjects of special interest to the rural communities, to the agricultural interests, and perhaps some of the things I may say now are only a repetition of what has been said and perhaps better said. But you all know that in Pennsylvania our aggregate mileage of all kinds of roads is some 90,000 miles; that under the provisions of the Sproul Bill, the State commits itself to the taking over and to the care and maintenance, and finally, to the complete improvement of some 8,000 miles of that 90,000. I wish it were possible that we could commit ourselves at once to the taking over and to the complete improvement of every inch of road in Pennsylvania to be built and maintained by the State; but you realize how impossible that is, how long it takes to organize, and also, that we cannot, from the ordinary revenues of the State, get sufficient money to complete such a system at as early a date as we would like, so that those of us living to-day, might have the advantage of this great improvement.

And yet, in approaching so important an improvement as that of our great roads, so important a question, we must do it carefully, conservatively and consistently, and so as we would improve the great rivers, as the United States has committed itself to the improvement and to the canalization of the Ohio River from Pittsburg to Cairo, to a depth of nine feet, so that that great stream may be navigable every day and every month of the year, sufficient money only is appropriated from year to year for that purpose that can be judiciously used, that is to meet the estimate of the engineers for that year's work, depending upon their organization first. And so in the organization of our State Highways Department, it will be absolutely foolish to give them the control of a great fund of money, a great amount of money, fifty million dollars, as is contemplated as the final and aggregate sum, because they could not use it at this time it; would not be the part of wisdom or business to do so, and, therefore, it has been advocated, and while this administration probably will neither recommend nor direct the expenditure of one penny of the proceeds of the proposed bond issue, if that issue is favorably considered by the people, I believe that only such amount should be appropriated from year to year as could be judiciously expended by the Department, and that those roads should be built where they are most needed.

Now the Department is working to that end. Before the organization of the present Highway Department, in all the years up to this time or up until a year and a half ago, Pennsylvania could boast of but seven or eight hundred miles of complete, improved highways. Since that time some two hundred miles have been completed and there is under contract to-day very many miles of such construction.

The great question, now that we have the automobile, is just the kind of a road to construct. We must consider the character of the country through which we pass, we must consider the grades, we must consider the traffic. And yet while some say we should not appropriate or spend a large amount of money at this time, because we don't know that perfect type of road, I do believe the time has come when we can say that we can build such a road to-day as is practically everlasting. On our easy grades, on our level roads, we are putting in to-day ,the State is building the concrete, solid concrete base road with the curb joining that concrete and enclosing on the surface a two-inch mat of asphalt and stone, so mixed as to give a perfect bond for all time to come, a perfect and easy bond, easy for the tread of horses, and in every respect considered the perfect road. Where the traffic is heavy and where the burden of the vehicle is especially heavy, we construct brick roads. In the isolated districts, where the macadam road will serve just as well, that sort of a road is constructed, and so to-day, in cost of roads, we have them varying from three thousand dollars per mile to sixteen thousand dollars per mile. That is to be the system, I hope, and that is to be the undertaking and the method of undertaking that will be pursued in this great advance movement.

Now the question of good roads interests not only the agricultural districts, but the centers of population as well; because in these days of easy travel we find our people going from place to place continuously. And in regard to the farm life, the fact that our roads are built, making visitations, making travel easy and our court centers and county seats more easily accessible, we find that life in the country is much more pleasant and the neighbors see each other more often and that there is a greater sociability and a greater happiness among all our people.

The agricultural interests and agricultural questions which you are here, no doubt, especially to discuss among yourselves, are always and ever will be the most important, not only in this Commonwealth but in all the Commonwealths of our entire country, and Pennsylvania is not behind in all that it commits itself to do for that interest. We read a great deal about Pennsylvania in our papers, and sometimes we criticise, we criticise honest men who are doing their duty, endeavoring to do their duty in high office, and we hear of the great things of other states, and while we may criticise at home here, there is not one among you who does not defend Pennsylvania, her institutions and her honor, when you happen to be in any other state. (Applause) And I am sure, your own State, your native State, this great State of yours, is your greatest pride. Now, while much might be said all the afternoon, the minutes and hours of the afternoon might well be consumed in talking of Pennsylvania, I do not propose to do so. The Senior Senator is here, and I ask for him and for his subject and for your own benefit, your very close attention to the financial scheme which has been suggested for Federal aid to post roads. That is becoming one of the most important subjects before us to-day, supremely important to Pennsylvania because of our area, because of our population and because of our great assessed value. Under that scheme, Pennsylvania would be entitled to a very large amount of the funds available and to be provided by the Government's credit.

I want at this time to again express my great delight for the pleasure and the privilege of not only speaking to you, but of meeting you here face to face in my own county. (Applause).

**The CHAIRMAN:** We have an item that is not on the program. Our good friends, the postoffice boys of the city, who serve you faithfully and well here, have a little memento that they wish at this time to present through Mr. Hughes.

**MR. HUGHES:** Mr. Chairman: As a tribute of their high esteem and the recognition and appreciation of the great advancement and improvement in the United States to the Postoffice Department at our National Capital ,and of the many benefits and advantages which have insured to the employees of this Department throughout our country, for which he is chiefly responsible as a member and former Chairman of the Senate Committee on Postoffices and Post Roads; and as a mark of cordial welcome to him on his first visit to Washington, I desire, on behalf of the employees of the Washington Postoffice, Postmaster Hemphill, his assistants, clerks, carriers, local and rural, to present a floral tribute to our guest, the Honorable Boies Penrose, (applause), Senior United States Senator representing this grand old Commonwealth of Pennsylsanvia. Senator Penrose, these beautiful flowers bloom for you and Uncle Sam's boys at our postoffice welcome you. (Applause)

SENATOR PENROSE: Mr. Chairman, Mr. Hughes—I assure you I appreciate very much this unexpected tribute on your part as representing the Postmaster and employees of the Postoffice in the City of Washington. The tribute is unexpected and I hardly can find words at this time to express the sincere gratification which I feel at realizing the kindly feelings which seem to prevail among the employees of the Postoffice towards me. In the many years during which I was Chairman of the Committee on Postoffices and Post Roads, I always took a pride and ambition in developing the postal service, in raising the standard of the employees, and carrying out, so far as I was able, such legislation as would better and render more comfortable their condition.

When I first became a member of the Committee, the appropriation for the Postoffice Department was under $100,000,000 a year. This year the appropriation is perhaps in the neighborhood of $280,000,000 or $290,000,000. The enormous increase in the brief period of fifteen years illustrates the enormous growth of the United States since the year 1897. When, fifteen years ago, I first began to become familiar with this subject, the rural service, rural delivery service was hardly thought of; it was merely a suggestion. To-day, over 40,000 rural carriers cover routes in the United States. practically placing the newspaper, the periodical literature and the letters, at the door of the farmer. Recently there has been inaugurated a system of Parcels Post which has already assumed great magnitude, and the possibilities of which startle the imagination.

All this has occurred in a short period of fifteen years, and that appropriation which, in 1897, those who were on the Committee served with apprehension and wondered what the country was coming to from the point of view of extravagance, as they beheld the expenditures of the Department pass the hundred million dollar mark, are likely, many of them, to live to see the expenditures of the Postoffice Department reach over $500,000,000 in a very few years. There is no greater barometer of the growth of the country and the enormous development of the country than that splendid army of men, postmasters and clerks and railway clerks and rural carriers, on whose shoulders fall this great burden, whose interests it has always been a pleasure for me to serve and to advance, for I realize that no employees of the Government have greater responsibilities thrust upon them than has he whose duty it is to deliver the citizen the mail, the delay in which or the absence in the delivery of which may cause grave anxiety, business trouble and endless complications, and the railway clerk who travels across the continent every day is exposing his life and his limb to accident and danger in the performance of his duty. Mr. Hughes, I thank you very much. (Applause)

The CHAIRMAN: Taking up the program as it is before you, we have just one absentee, Senator Bourne. I see in looking up his biography that he was born in New Bradford, Mass., Feb. 23, 1855. He attended school at Harvard University. From Harvard he went to sea. He was shipwrecked off Formosa ,picked up and taken to Portland, Oregon. This is the manner in which he returned to the United States. In 1881 he was admitted to the bar. He was a member of the House of Representatives of Oregon, sessions of 1885, 1886 and 1897. In 1907 he was elected to the United States Senate. His term will expire in 1913.

This gives you some idea of his busy and active life. He has been engaged in a number of business enterprises, and we find him to-day advocating the appropriation of three billions of dollars, by the National Government, for the purpose of establishing a great road system, known as Post Roads, throughout the United States, which shows you that he has given the Road question great consideration. That we might place on record what he says in regard to roads, in a letter that he addressed to me, I will at this time call on Prof. Menges to read that letter from Senator Bourne, Chairman of the Joint Committee on Federal Aid in the Construction of Post Roads.

Prof. Menges then read the letter, as follows:

Congress of the United States, Joint Committee on
Federal Aid in the Construction of Post Roads.
Washington, D. C., May 17, 1913.

Hon. George G. Hutchison, Chairman, Good Roads Session, Farmers' Annual Normal Institute, Washington, Pa.

My Dear Mr. Hutchison:

I regret extremely that a temporary indisposition prevents my attending the Good Roads Session of your Institute, to be held May 22,1913. Ever since the receipt of your invitation to make an address at your meeting, I have anticipated with particular pleasure meeting so many of the citizens of Pennsylvania and especially the farmers of your State, so as to avail myself of the opportunity of thanking you for the cordial support received in our efforts to secure the enactment of a parcel post law. As you are perhaps aware, I devoted more than a year to the work of framing a parcel post bill and helping to secure its passage through Congress. I deem it appropriate to say that in all parcel post work both in committee and in the Senate, I had the hearty co-operation and assistance of my friend and co-worker, Senator Boies Penrose, of your State. It is also pertinent to remark, in view of the subject under discussion at this session of your Institute, that Senator Penrose has taken an active interest in the effort to secure practical and wise legislation for Federal aid to good roads, a problem, which, in my opinion, is of far greater economic importance than the parcel post. In fact, I believe the question of good roads overshadows any other economic problem now before the American people. Senator Penrose is a member of the Joint Congressional Committee selected by Congress to make a special study of the subject of Federal aid in the construction of Post Roads and his advice in the construction of the bill and influence in securing its enactment will, I am sure, be of the greatest value, as it was in the parcel post legislation.

I have devoted over a year's time, thought and study to the subject of good roads, and some weeks ago evolved a suggested plan and explanation which I have submitted to the Joint Congressional Committee for their consideration, and enclose herewith a copy of same with the thought that after perusal of same you may care to have this letter and a copy of my good roads plan read for the purpose of giving your audience an opportunity of presenting criticisms, comments and suggestions, in the adoption of which the plan would be improved.

Should the plan be adopted by Congress, Pennsylvania, after amending her Constitution, would be entitled, if she saw fit, to receive $56,500,000 in five years from the Federal Government to aid in road construction in your State; provided she complied with the requirements of the plan and issued $56,000,000 of Pennsylvania fifty year four per cent. bonds and deposited same with the Treasurer of the United States, paying annually into the United States Treasury $2,260,000 in interest. At the expiration of fifty years from the date of the issuance of the bonds, the State bonds would be returned to the State, canceled. Thus Pennsylvania would pay in fifty years $113,000,000 for the use of the $56,500,000 furnished by the Federal Government. If Pennsylvania could sell her fifty-year bonds in the open market on a three per cent. basis she would pay in fifty years $84,750,000 in interest and then have to repay the principal of $56,500,000, or a total of $141,250,000 in fifty years, or $28,250,000 more than she would pay if my suggested plan were adopted and she took advantage of the opportunity in securing her $56,500,000 from the Federal Government on a four per cent. basis, with the principal taken care of at the end of the fifty years by the Federal Government out of the sinking fund.

Furthermore, under my plan, Pennsylvania would receive each year from the Federal Government $1,130,000 for road improvement and maintenance provided she contributed an equal amount.

Again expressing through you to the members of your Institute my regret that conditions deny me the pleasure of meeting with you, I remain,

Very respectfully yours,

(Signed) Jonathan Bourne, Jr.

DIRECTOR MARTIN: I move that the letter addressed to this Convention by Senator Bourne be made a part of the proceedings of this Institute.

The motion was seconded and adopted.

# FEDERAL AID TO GOOD ROADS

## Suggested Plan for intelligent and Practical Expenditure of Three Billions of Dollars during a Period of Fifty Years by the States and Federal Government in the Construction, Improvement and Maintenance of Good Roads.

By HON. JONATHAN BOURNE, JR., *United States Senator from Oregon*

*To the members of the Joint Committee on Federal Aid in the Construction of Post Roads:*

Gentlemen: Outside of a few great fundamentals of government, I deem Federal aid to good roads the greatest, and certainly the most important economic question now before the American people. Better, cheaper, and additional transportation facilities in the United States must benefit every inhabitant and result in more development and greater productiveness of our natural resources, meaning more and cheaper food and necessities of life. Large areas of virgin territory must be developed, first by trails, then by roads, next steam railroads, then electric lines and, finally, by a system of intelligently and honestly constructed and maintained wagon roads which, in this petrol age ,with its motor truck and passenger bus, should vastly increase the happiness, prosperity, and comfort of our people and double the value of our agricultural lands. A great system of rural transportation would be developed with rates regulated by actual competition, open to poor and rich alike, as no expensive privately owned terminals, roadbeds, tracks, or equipment would be required. The good wagon roads would be open to the use of everybody, and the equipment, relatively inexpensive, would be within the means of many.

It is generally conceded that the Federal Government, under the post roads and commerce clauses of the Constitution, unquestionably has the right to make appropriations for or otherwise aid in the construction and maintenance of good roads.

### ESSENTIALS OF A SATISFACTORY PLAN

About a year ago I began the study of Federal aid to good roads. After devoting considerable time and thought to the problems involved I arrived at the following general conclusions:

(1) A plan should be developed that would be satisfactory and acceptable to the Federal Government and the 48 States, representing, in effect, 49 different personal equations, thus insuring co-operation between the Federal Government and the States.

(2) A plan to be satisfactory must be practicable, simple, and so framed as to insure the most intelligent and honest expenditure of funds, whether contributed by the States or by the Federal Government, or both.

(3) The Federal Government's contribution or plan of co-operation must be such as to induce the States to undertake road construction, improvement, and maintenance actively, intelligently, and extensively.

(4) The plan should not only encourage construction but insure improvement and maintenance of roads already built or to be built.

(5) The money expended to-day should benefit, and coordinate with the money to be expended years hence; in order words, the expenditures of today should be so made as to correlate with the expenditures of the future.

(6) Federal supervision of expenditures of the Federal money should not interfere with the rights of States or lead to a Federal espionage irritating to the States and resulting in the building up of a great Federal bureau.

(7) Any plan of Federal aid or cooperation must insure an equitable apportionment among the 48 states.

I was convinced of the desirability of the earliest possible solution of the problem to prevent unintelligent or undesirable legislation in response to the steadily insistent, growing demand for Federal aid in the construction of good roads.

### SUGGESTED BILL

For a number of months I sought in vain for a key to the problem, but finally an idea occurred to me from which I evolved a plan that, after weeks of careful analysis and study, appeals to me as having merit, and I therefore respectfully submit the same herewith in the form of a suggested bill for your consideration. criticism, modification, adoption, or rejection:

> *Be it enacted by the Senate and House of Representatives in Congress assembled,* That in order to establish, construct, improve, or maintain public roads that are now or may hereafter be needed for use as post roads, military roads, or for interstate commerce, there be, and hereby is, created a fund to be known as the United States Highway Fund. Said fund shall be raised in the manner herein provided, but the Treasurer of the United States is hereby authorized to receive and place to the credit of said fund any money that may be contributed from other sources and to expend the same upon the order of the United States Highway Commission or in accordance with the conditions of the contribution.
>
> Sec. 2. That for the purpose of providing money for the United States Highway Fund the Secretary of the Treasury is hereby authorized and directed to issue and sell by popular subscription and upon a pro rata allotment basis, at not less than par, bonds of the United States in such form as he may prescribe and in denominations of $20 or multiples of that sum, said bonds to be payable 50 years from the date of issue and to bear interest, payable semiannually, at the rate of 3 per cent per annum, the total amount of said bonds not to exceed $1,000,000,000, and the issue and sale of same not to exceed such amounts as may be necessary from time to time to enable the Treasurer of the United States to make payments from the United States highway fund to the several States in accordance with the provisions of this act. Bonds issued issued under authority of this act or the income therefrom shall not be subject to taxation of any kind for any purpose.

Sec. 3. That before any State shall be entitled to take advantage of the provisions of the act, it shall establish by law a State highway commission having general supervision of road construction and improvement in that State, which said commission shall have general supervision of the expenditure of money received from the United States Highway Fund, subject only to the provisions of this act and of State laws not inconsistent therewith.

Sec. 4. That the United States Highway Fund shall be apportioned and credited to the several States in the following manner: The United States Highway Commission hereinafter created, shall ascertain in the most practicable manner from the best information available the total land area, the population according to the last Federal census, the total assessed valuation of all taxable property, and the total mileage of public highways in each of the several States, and shall compute the percentage of the total of each of these four items possessed by each State. They shall then compute the average of the four percentages for each State, and this avearge shall be the per cent of the $1,000,000,000 United States Highway Fund that shall be apportioned and credited to each State. Said commission shall notify the Treasurer of the United States of the result of their ascertainment and computation, which shall be made as of a date to be fixed by the commission. Such fund, so apportioned, shall be paid to the States only in accordance with the provisions of this act.

Sec. 5. That whenever any State, through its duly authorized agents, shall apply for any part of its share of the United States Highway Fund, but not exceeding 20 per cent thereof in any year, and shall deposit with the Treasurer of the United States its bonds for such amount payable in 50 years and bearing interest, payable semiannually, at the rate of 4 per cent per annum, said Treasurer of the United States will issue and sell by popular subscription and upon a pro rata allotment basis United States highway bonds herein authorized to the amount that may be necessary to pay to said State the amount of money applied for, and upon the sale of said bonds shall pay over the proceeds to the custodian of the public funds of the State: *Provided,* That the bonds of any State shall not be accepted if the total amount of bonds of such State, including the bonds issued to take advantage of the provisions of this act, shall exceed 10 per cent of the amount of the assessed valuation of all taxable property in such State. When the Treasurer of the United States shall receive any payment of interest on State bonds deposited in the manner above provided he shall devote three-fourths thereof to the payment of the interest due on the corresponding United States highway bonds and one-fourth, herein designated as a sinking fund, he shall deposit in the Treasury of the United States to be used from time to time as the general funds of the United States are used. The Treasurer of the United States shall keep an account with each State that shall deposit bonds and receive funds under the provisions of this act, and shall credit said State with interest compounded annually at the rate of 3 per cent per annum on the sinking funds paid in. At the time of the maturity of the bonds deposited by any State, if all payments of interest have been made when due, the Treasurer of the United States shall cancel said bonds and return them to the State isuing the same, without requiring any payment of the principal.

Sec. 6. That on the 1st day of February of each year the Treasurer of the United States shall pay to the custodian of the public funds of each State, from any funds in the Treasury not otherwise appropriated, an amount of money equal to 2 per cent of the amount of State bonds said State has on deposit with the Treasurer of the United States under the provisions of this act. The money so paid shall be expended by said State only in the maintenance of public highways. The Treasurer of the United States shall withhold the payment of money to any State under the provisions of this section in the event that such State default in payment of any interest due or in the event that the United States Highway Commission herein created shall certify to said United States Treasurer that money theretofore paid to said State for maintenance purposes has not been expended with reasonable effectiveness for the maintenance of public highways or that the State has failed to expend an equal amount of its own funds during the preceding 12 months for the same purpose.

Sec. 7. There is hereby created a United States Highway Commission, to be composed of the chairman of the Senate Committee on Post Offices and Post Roads, the chairman of the House Committee on the Post Office and Post Roads, and the Director of the Office of Public Roads. Such commission shall have only an advisory voice in the expenditure of the United States Highway Fund in the several States. It shall have its head office in the District of Columbia, but may create highway divisions, never exceeding in number one for each State and may maintain a division office in charge of a United States highway engineer in each division. Said commission shall have power to employ such clerical and expert assistance as may be provided for by appropriations made by Congress from time to time, and may require the assistance and cooperation of the officers and employees of any department in its work.

Sec. 8. For the further aid and encouragement of highway improvement in the several States, the United States Highway Commission shall maintain in the District of Columbia a school for special instruction in practical highway and bridge engineering, the entrance requirements of which school shall include completion of preparatory courses in civil engineering and such other studies as the commission shall specify qualifying the student to enter upon the special study of the practical problems of highway and bridge engineering. The rules, regulations, and curriculum of said school shall provide for instruction for two years for one student from each congressional district, selected by competitive examination, but if there be no qualified applicant for admission from any congressional district such vacancy may be filled by the admission of a student from some other congressional district in the same State. Upon the admission of a student to the school of highway engineering such student shall be paid as traveling expenses 4 cents for each mile of distance necessarily traveled in going from his home to Washington, D. C., and at the end of each calendar month thereafter during the continuance of of such student in said school he shall be paid $50 to cover living and incidental expenses. The United States Highway Commission shall make rules and regulations for the management of said school and shall have entire control of same, subject only to the Constitution and laws of the United States. In connection with said school said commission shall maintain a testing laboratory in which said commission shall cause tests to be made of road or bridge building material free of charge at the request of the duly authorized highway officials of any State.

Sec. 9. That for the purpose of carrying out the provisions of this act, there is hereby appropriated out of any moneys in the United States Treasury not otherwise appropriated, the following amounts, or so much thereof, as may be necessary;

For the renting of suitable quarters for the United States Highway Commission in the District of Columbia, $———.

For the renting of suitable quarters for the school of highway and bridge engineering, $———.

For the payment of salaries of clerical and expert assistance for the United States Highway Commission, $———.

For the payment of salaries of instructors in the school of highway and bridge engineering, $———.

For the purchase of testing laboratory equipment and office furniture and supplies, $———.

For the payment of the salaries of ——— division engineers, $———.

For the renting of quarters for ——— division engineers, $———.

## APPROXIMATE APPORTIONMENT TO STATES

I submit herewith a table showing the percentage and amount of apportionment each State would be entitled to receive under a plan giving area, population, assessed valuation, and road mileage equal weight in the calculation, these percentages being computed only to two decimal places and the amounts given in round numbers.

| State. | Land area in square miles. | Population, 1910. | Assessed valuation, fiscal year 1912. | Total mileage of roads. | Apportionment to Each State. | |
|---|---|---|---|---|---|---|
| | | | | | Per cent. | Amount. |
| Alabama, | 51,279 | 2,138,093 | $484,851,212 00 | 49,639 | 1.72 | $17,200,000 |
| Arizona, | 113,840 | 204,354 | 140,338,191 00 | 5,987 | 1.13 | 11,300,000 |
| Arkansas, | 52,525 | 1,574,449 | *425,478,614 00 | 36,445 | 1.44 | 14,400,000 |
| California, | 156,092 | 2,377,549 | 2,919,342,389 00 | 48,069 | 3.59 | 35,900,000 |
| Colorado, | 103,658 | 799,024 | 430,000,000 00 | 29,693 | 1.59 | 15,900,000 |
| Connecticut, | 4,820 | 1,114,756 | *1,041,334,019 00 | 12,583 | .87 | 8,700,000 |
| Delaware, | 1,965 | 202,322 | 92,575,760 00 | 3,000 | .14 | 1,400,000 |
| Florida, | 54,861 | 752,619 | 218,887,518 00 | 17,579 | .95 | 9,500,000 |
| Georgia, | 58,725 | 2,609,121 | 842,000,000 00 | 82,230 | 2.45 | 24,500,000 |
| Idaho, | 83,779 | 325,594 | 413,780,394 00 | 18,403 | 1.16 | 11,600,000 |
| Illinois, | 56,002 | 5,638,591 | 2,343,673,282 00 | 94,141 | 3.94 | 39,400,000 |
| Indiana, | 35,885 | 2,700,876 | 1,891,602,077 00 | 67,996 | 2.51 | 25,100,000 |
| Iowa, | 55,586 | 2,224,771 | 713,318,325 00 | 102,427 | 2.50 | 25,000,000 |
| Kansas, | 81,774 | 1,690,949 | 2,746,900,291 00 | 98,302 | 3.28 | 32,800,000 |
| Kentucky, | 40,181 | 2,289,905 | 1,089,265,143 00 | 53,744 | 1.98 | 19,800,000 |
| Louisiana, | 45,409 | 1,656,388 | 546,650,157 00 | 24,962 | 1.32 | 13,200,000 |
| Maine, | 29,895 | 742,371 | 478,192,054 00 | 25,528 | .93 | 9,200,000 |
| Maryland, | 9,941 | 1,295,346 | 979,309,976 00 | 16,773 | .99 | 9,900,000 |
| Massachusetts, | 8,039 | 3,366,416 | 4,249,699,355 00 | 17,272 | 2.73 | 27,300,000 |
| Michigan, | 57,480 | 2,810,173 | *2,288,000,000 00 | 68,906 | 2.88 | 28,800,000 |
| Minnesota, | 80,858 | 2,075,708 | 1,212,567,794 00 | 79,323 | 2.59 | 25,900,000 |
| Mississippi, | 46,362 | 1,797,114 | *399,029,000 00 | 39,619 | 1.43 | 14,800,000 |
| Missouri, | 68,727 | 3,293,335 | 1,736,371,588 00 | 107,923 | 3.35 | 33,500,000 |
| Montana, | 145,776 | 376,053 | 346,550,585 00 | 23,319 | 1.72 | 17,200,000 |
| Nebraska, | 76,808 | 1,192,214 | 463,371,389 00 | 80,338 | 2.05 | 20,500,000 |
| Nevada, | 109,821 | 81,875 | *85,347,058 44 | 12,751 | 1.12 | 11,200,000 |
| New Hampshire, | 9,031 | 430,572 | 397,647,530 00 | 15,116 | .51 | 5,100,000 |
| New Jersey, | 7,514 | 2,537,167 | 2,289,770,280 78 | 14,842 | 1.77 | 17,700,000 |
| New Mexico, | 122,503 | 327,301 | †72,000,000 00 | 16,920 | 1.35 | 13,500,000 |
| New York, | 47,654 | 9,113,614 | 11,022,985,914 00 | 79,279 | 7.86 | 78,600,000 |
| North Carolina, | 48,740 | 2,206,287 | *494,708,570 00 | 48,285 | 1.74 | 17,400,000 |
| North Dakota, | 70,183 | 577,056 | 294,770,325 00 | 61,593 | 1.56 | 15,600,000 |
| Ohio, | 40,740 | 4,767,121 | 6,400,000,000 00 | 88,861 | 5.02 | 50,200,000 |
| Oklahoma, | 69,414 | 1,657,155 | 1,326,840,333 00 | 71,325 | 2.33 | 23,300,000 |
| Oregon, | 95,607 | 672,765 | ‡905,011,679 00 | 29,475 | 1.66 | 16,600,000 |
| Pennsylvania, | 44,832 | 7,665,111 | 5,917,119,205 25 | 87,887 | 5.65 | 56,500,000 |
| Rhode Island, | 1,067 | 542,610 | 552,991,354 00 | 2,121 | .39 | 3,900,000 |
| South Carolina, | 30,495 | 1,515,400 | 291,531,003 00 | 32,075 | 1.15 | 11,500,000 |
| South Dakota, | 76,868 | 583,888 | 354,278,413 00 | 56,354 | 1.58 | 15,800,000 |
| Tennessee, | 41,687 | 2,184,789 | 625,010,386 00 | 45,913 | 1.70 | 17,000,000 |
| Texas, | 262,398 | 3,896,542 | 2,515,594,636 00 | 128,971 | 5.66 | 56,600,000 |
| Utah, | 82,184 | 373,351 | 200,299,207 00 | 8,320 | .96 | 9,600,000 |
| Vermont, | 9,124 | 355,596 | 221,447,387 00 | 14,406 | .42 | 4,200,000 |
| Virginia, | 40,262 | 2,061,612 | 907,273,651 00 | 43,399 | 1.73 | 17,300,000 |
| Washington, | 66,836 | 1,141,990 | 1,005,086,251 00 | 34,284 | 1.64 | 16,400,000 |
| West Virginia, | 24,022 | 1,221,119 | 1,119,828,173 00 | 32,109 | 1.32 | 13,200,000 |
| Wisconsin, | 55,256 | 2,333,860 | 2,077,925,166 00 | 61,090 | 2.56 | 25,600,000 |
| Wyoming, | 97,594 | 145,965 | 182,028,280 00 | 10,569 | 1.05 | 10,500,000 |
| Totals and average, | 2,974,099 | 91,272,266 | $67,763,587,864 45 | 2,199,646 | ...... | $1,000,100,000 |

*1911. †Rough estimate. ‡1910.

## REASONS FOR FACTORS USED

To my mind, area should be a factor because of the greater necessity for more or better roads in the newer or larger States; population a factor because whatever direct contribution is made by the people through the Federal Government is a tax on all the people; assessed valuation of the property in each State a factor because of the utilization of the Federal credit through the Government becoming practically an indorser for the States under my suggested plan, and because the taxable property of the State must bear a large proportion of the State's expenditure for road improvement, hence the property of the States should receive recognition in accordance with the liability assumed; and mileage of roads already in use a factor as a recognition of industry and efficiency of those States that have already constructed roads at their own expense.

Enactment of legislation herein suggested would benefit the States by the utilization of the credit of the Federal Government superior to that enjoyed by the States. On February 28, 1913, the interest-bearing debt of the United States was as follows:

| | |
|---|---|
| 2 per cent. bonds, | $730,882 130 |
| 3 per cent. bonds, | 113,945 460 |
| 4 per cent. bonds, | 118,489 900 |
| 2½ per cent. bonds, | 2,380 120 |
| Average, 2.37 per cent. bonds, | $965,697,610 |

The low average of 2.37 per cent interest is, of course, due to the national bank circulation privilege and the nontaxable feature of those bonds. I believe that for many years to come the Federal Government will have no difficulty in selling a billion 50-year non-payable 3 per cent semiannual interest bearing bonds at par or better by popular subscription, especially if not more than 20 per cent could be sold in any one year. I doubt if, as a whole, the States would be able to sell 50-year State bonds at par at any lower rate of interest than 4 per cent. I figure the national wealth of the United States at $14,000,000,000. With our enormous undeveloped natural resources, steadily increasing population, great virility, energy, and industry of our people this wealth must steadily and enormously increase. According to the United States Office of Public Roads the agregate assessed valuation shown by the different States for the year 1912 is $67,763,587,864.45, but there is a vast difference in ratio of assessed to actual value in the different States, some States endeavoring to assess on full cash value of property and others as low as 12.5 per cent.

The suggested plan, if adopted, enables the States to enjoy the superior credit of the Federal Government and without additional cost to the States establishes a sinking fund that in 50 years' time would pay off the States' indebtedness. At the same time the Federal Government really assumes no consequential responsibility, as no State would default on its principal or interest charges it the total bonded indebtedness of the State did not exceed 10 per cent of the assessed value of the property in the State. A sinking fund of $1, or 1 per cent per year, payable at the end of each year, with annual interest on each payment at the rate of 3 per cent compounded each year with amount to $100, or 100 per cent, in 46.89 years.

## HOW THE PLAN WOULD OPERATE

To illustrate the practical working of the plan, let us suppose that all the States avail themselves of the opportunity of utilizing the superior credit of the United States up to the 20 per cent annual limitation for each State. We would have $200,000,000 of 50-year semiannual 4 per cent State bonds deposited with the Treasurer of the United States, upon which collateral the Secretary of the Treasury would offer for popular subscription, at not less than par and upon a pro rata allotment basis, $200,000,000 of 3 per cent Federal bonds, and from the $200,000,000 obtained in the sale of the same, pay to the States the par amount of their bonds according to the percentage of apportionment set forth in the bill. The Federal Government would receive from the States, in semiannual payments, interest at the rate of 4 per cent, or $8,000,000 annually, out of which it would pay to the investors in the Federal bonds $6,000,000 annually, to pay annual interest of 3 per cent on $200,000,000 United States 50-year 3 per cent bonds, leaving an excess of $2,000,000 annually received from the States over what the Federal Government would pay in interest charges on a similar amount of Federal bonds.

On this excess of $2,000,000 the Federal Government would allow 3 per cent annual compound interest. At the end of 46.89 years this sinking fund would amount, under this plan, to $200,000,000, so that the Federal Government would have the funds to pay off the bonds it had issued to the public for which it held the State bonds as collateral, and at the end of 50 years from the date of issuance of the State bonds the Federal Government would return said bonds to the respective States marked "Canceled." By depositing their bonds with the Federal Government as collateral and utilizing the superior credit of the Federal Government in getting money at 3 per cent, the States would ultimately have received $200,000,000 cash at 1 per cent cheaper interest than they themselves could secure in a public sale of their own bonds. This utilization of the Federal Government's superior credit, without any greater expense to the States than the interest charge alone if they sold their bonds in the open market, together with the Federal Government's 3 per cent annual interest allowance, would provide the fund with which the obligation of the States would be entirely liquidated at the expiration of 50 years.

The proceeds from the sale of the Federal bonds would be turned over to the highway commissions in the States, an instrumentality which should be directly responsive and accountable to the electorate of the States, thus preventing interference with State rights and eliminating any legal supervision on the part of the Federal Government and minimizing the danger of building up a large Federal bureau. At the same time cooperation would be assured through realization on the part of the members of the State highway commissions that although the Federal district engineers would have no legal supervision as to the expenditure of money put into construction of roads, yet in their inspection of the maintenance of roads the Federal and district engineers would necessarily learn whether the road construction had been honest and intelligent, and the anticipation of this maintenance inspection by Federal agents would cause the State engineers to do better construction work. Thus is created an equal optional opportunity to all the States. True some States will have to adopt constitutional amendments before they can issue bonds for public improvements. Under my plan, however, the Federal Government furnishes the opportunity. Each State must decide if it desires to accept it. If so, it must comply with the Federal requirements. It could take as much or as little money as it desired except it could not exceed 20 per cent of its apportionment in any one year and in an aggregate of years could not exceed its total apportionment.

I requested Mr. J. E. Pennybacker, the committee's satistician, to examine the constitutions of the different States and submit a list of those States authorized to borrow money for public works and of the States which would require a constitutional amendment giving such authority.

The States permitted to issue bonds for public works and the amounts each would receive from my plan are as follows:

| | |
|---|---|
| Alabama, | $17,200,000 |
| California, | 35,900,000 |
| Connecticut, | 8,700,000 |
| Delaware, | 1,400,000 |
| Idaho, | 11,600,000 |
| Illinois, | 39,400,000 |
| Iowa, | 25,000,000 |
| Kansas, | 32,800,000 |
| Kentucky, | 19,800,000 |
| Maine, | 9,200,000 |
| Maryland, | 9,900.000 |
| Massachusetts, | 27,300,000 |
| Minnesota, | 25,900,000 |
| Mississippi,† | 14,800,000 |
| Montana, | 17,200,000 |
| New Hampshire, | 5,100,000 |
| New Jersey, | 17,700,000 |
| New Mexico, | 13,500,000 |
| New York, | 78,600,000 |
| North Carolina, | 17,400,000 |
| Oklahoma, | 23,300.000 |
| Rhode Island, | 3,900,000 |
| South Carolina, | 11,500,000 |
| Tennessee,† | 17,000,000 |
| Vermont,† | 4,200,000 |
| Washington, | 16,400,000 |
| Wyoming, | 10,500,000 |
| | $515,200,000 |

51.52 per cent. of the total.

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†Constitution is silent on this subject.

The States in which constitutional amendments are necessary to permit issuance of bonds for public works and the amount each State would receive under my plan are as follows:

| | |
|---|---|
| Arizona, | $11,300,000 |
| Arkansas, | 14,400,000 |
| Colorado, | 15,900,000 |
| Florida, | 9,500,000 |
| Georgia, | 24,500,000 |
| Indiana, | 25,100,000 |
| Louisiana, | 13,200,000 |
| Michigan, | 28.800,000 |
| Missouri, | 33,500.000 |
| Nebraska, | 20,500,000 |
| Nevada, | 11,200,000 |
| North Dakota, | 15,600,000 |
| Ohio, | 50,200,000 |
| Oregon, | 16,600,000 |
| Pennsylvania, | 56,500,000 |
| South Dakota, | 15,800,000 |
| Texas, | 56,600,000 |
| Utah, | 9,600,000 |
| Virginia, | 17,300,000 |
| West Virginia, | 13,200,000 |
| Wisconsin, | 25,600.000 |
| | $484,900,000 |

48.49 per cent of the total.

BONDS WOULD BE OBSERVED

The 20 per cent per annum limitation and the fact that States representing practically 50 per cent of the proportional allotment would have to amend their constitutions before permitted to issue bonds for public improvement, clearly shows that not over $100,000,000 of Federal bonds would be offered for sale in any one year. Would the people absorb this amount of Federal 3 per cent nontaxable 50-year bonds? In my opinion they unquestionably would.

These bonds being nontaxable, would be the equivalent of a 4 per cent taxable bond, especially if the contemplated income tax be enacted.

The banks of the United States showed the following individual deposits on June 14, 1912:

| | Number. | Amount. | Average rate of interest paid depositors. |
|---|---|---|---|
| National banks, | 7,372 | $5,825,461,168 36 | No data. |
| Mutual savings banks, | 630 | 3,608,657,828 11 | 3.90 |
| Stock savings banks, | 1,292 | 842,897,859 61 | 3.03 to 3.64 |
| State banks, | 13,381 | 2,919,977,897 99 | No data. |
| Private banks, | 1,110 | 152,494,618 90 | No data. |
| Loan and trust companies, | 1,410 | 3,674,578,238 92 | No data. |
| Total, | 25,195 | $17,024,067,606 89 | ........... |

Note that 3.90 per cent is the average rate of interest to depositors in the 630 mutual savings banks, and 3.03 per cent to 3.64 per cent is the rate of interest paid depositors in the 1,293 stock savings banks. There can be no doubt but what depositors in these institutions would prefer the Federal 3 per cent. nontaxable bonds with the Government credit behind them to the security and interest offered by the savings banks.

In 1912 the volume of transactions in the 151 clearing houses of the United States was $168,506,320,000. With this volume of clearances the American people would certainly absorb, if given an opportunity, $100,000,000, or several hundred million of 50-year 3 per cent nontaxable Federal bonds.

On June 30, 1912, according to the Comptroller of the Currency, there was $3,264,500,000 of coin and other money in the United States, of which $1,563,800,000 was in the bank, thus leaving $1,700,700,000 in the tills, pockets, and stockings of the people, a large proportion of which amount would undoubtedly be invested in these Federal bonds if offered for popular subscription on a pro rata allotment basis.

The requirement that the bonds shall be sold by public subscription and upon a pro rata allotment basis would prevent a few very rich men acquiring the bonds in the original purchase. In order for them to acquire more than their proportional allotment under the original subscriptions, they would have to pay other subscribers and allotees such premiums as they would be willing to accept.

## AID IN ROAD MAINTENANCE

Maintenance of roads is a factor which should be given weight equal with construction. The Federal Government, by the suggested plan, would contribute—donate, if you please—to each State 2 per cent of the total amount of Federal aid that had been extended to the State for construction in utilization of the Federal Government's superior credit. Thus, the States, if they deposited the aggregate of $200,000,000 of State bonds during any one year and received $200,000,000 in money from the Federal Government, would thereafter receive $4,000,000 annually as a direct contribution from the Government, provided these States expended an equal amount for annual maintenance.

Where direct Federal contributions are made, it is desirable that direct Federal supervision should be provided, and here we again get into the danger zone of the creation of a great Federal bureau. France, after a hundred and fifty years effort and an expenditure of a billion and a half dollars in building up its system of roads has 371,000 miles with 80,000 patrolmen for care and maintenance. The United States has to-day, in round numbers, $2,200,000 miles of road and if we had a patrolman to maintain every 5 miles of road we would have an organization of 440,000 Federal employes directly responsive to a bureau here in Washington, and the tendency would be for its centralization as a political machine, which, under our system of Government, would absolutely control the political machinery of the country. To minimize this danger, and, I think, avoid same, I would suggest that either in the law or by authorized rule and regulation we divide the United States into Federal road districts composed of States or groups of States containing approximately 50,000 miles of roads and create in the Office of Public Roads a number of district road and bridge engineers, so that there would be one Federal representative for each district.

The duties of this engineer would be to go over his district and report to the United States Highway Commission here in Washington whether the annual maintenance contribution of the Government apportioned to that district had been intelligently and honestly expended. He could also give lectures as opportunity permitted, regarding road engineering and practical construction, also furnish the State highway commisions with such information as the Federal bureau had, touching on the subject, but neither he nor his superior, the Federal Director of Public Roads, would have the right to withhold the Federal maintenance actually contributed to his district simply because his judgment differed from that of the State highway commission with reference to intelligent and honest expenditure of the Federal part of the maintenance fund. The United States Highway Commision; consisting of the chairman of the two Committees on Post Offices and post Roads, with the Director of Public Roads, would have the final voice and decision as to whether this fund should be withheld or not.

My idea in making the two chairmen of the Post Offices and Post Roads Committees ex officio members of the highway commission is that much valuable information could be secured from the 43,000 rural carriers under the Fourth Assistant Postmaster General's jurisdiction and which comes directly under that of these congressional commitees, and for the further reason that as an expenditure of the people's money is involved, and as Congress under our form of government is the only direct representative of the people, the determinative power of withholding maintenance should be in Congress and not in a bureau; and for the still further reason that the patrol system built up in the States and responsive to the State highway commissions, if under the subservience of the Federal bureau, would be responsive to a Federal head and the danger would exist of building up a big Federal political machine. The Federal commission would have the advantage of the special training, skill, and development of the Director of the Office of Public Roads, but the Senator and Member of Congress, chairman of the Committees on Post Offices and Post Roads, being a majority of the commission, would decide as between the Federal bureau and the highway commission of the State, thus avoiding making the State instrumentality subordinate to a Federal bureau head or department. If the road-patrol system is to be used as a political machine it is much better from the general-welfare standpoint that the danger of misuse should be minimized by dividing same into 48 State machines responsive to the State instrumentalities rather than directly to the Federal bureau here in Washington.

## AID BY EDUCATION

The creation of a Federal academy of engineering for road and bridge construction here in Washington appeals strongly to me as desirable to provide a national institution for the education and increased efficiency of technical experts so that an annual supply of qualified engineers would be furnished from which the States could draw for their State and district supervision, and I would suggest liberal appropriations for that institution, and the creation therein of a national laboratory in which to test all road material sent in by citizens or State highway commissions to the Federal bureau to secure information and advice in reference to available material for both road construction and maintenance. The Federal bureau would act as a medium for the dissemination of information bearing particularly on the subject of good road and bridge construction according to the experience and development of that art not only here in this country but throughout the world.

## ADVANTAGE OF THE PLAN

In conclusion, I realize that the suggested bill can undoubtedly be improved, but after many weeks' thought and study on the subject it apeals to my mind as presenting a plan of which at least some portions can be utilized to advantage. The strong features are:

Incentive to the States for activity and expedition in road construction by utilization of the superior credit of the Government.

The establishment of practical and desirable cooperation between the Federal Government and the States.

Teamwork between the Federal specialists on good roads and the State specialists, without subservience in the State instrumentality to any Federal bureau or department.

The establishment of a practical concrete plan for a long period with definite knowledge as to the liability of the Federal Government (its liability in the indorsement of the State credit being inconsequential in one viewpoint, namely, that the State would ever default either on principal or interest of its bonds).

A bond limitation of 10 per cent of assessed property valuation, with realization that default in payment of interest or principal to the Federal Government must result in discontinuance of future Federal assistance and cessation of immigration or further outside investment in the State, would eliminate possibility of any default.

Under my plan the maximum annual liability of the Federal Government would be $200,000,000 contribution for maintenance, thus relieving Members of both branches of Congress from the tremendous pressure for increased appropriations in various congressional districts and States.

The minimization of the possibility of building up a great Federal machine necessarily resultant upon direct supervision by a Federal bureau or giving a department head the right of determination as to whether Federal funds should continue or not.

The establishment of a Federal academy for the development and training of specialists in road and bridge construction, thus supplying for the States and districts a corps of trained specialists and also a medium for the best information bearing on the subject and creating an instrumentality for consultation and interchange of ideas.

My plan rather prevents the possibility of centralization of power in the Federal Government, protects and preserves the rights of the States, improves the State instrumentalities in efficiency, and establishes cooperation, practicable and desirable, between the Federal Government and the States.

The adoption of this comprehensive plan insures an opportunity, extending over a period of fifty years, for the expenditure of three billions of dollars in improvement and maintenance of wagon roads in the United States, thus giving useful employment to many people and providing systematic and intelligent highway construction, resulting in the United States securing what would probably be the best and most extensive system of highways in the world and increasing our national wealth many, many times the amount of the investment.

Respectfully submitted,

JONATHAN BOURNE, JR.

The CHAIRMAN: After a gentleman has spoken to you so eloquently and nicely as my friend has, it is a little late to introduce him. But I cannot let the occasion go by without saying a word in regard to the record of our friend and distinguished visitor who is going to address us this afternoon.

Some years ago I was an attache of the State Senate, and there formed the acquaintance of these two gentlemen that are sitting here to my right. I was then very much interested in the tax legislation known as the Taggard Bill, which is very well known to some of my Granger friends who are present, and of course, I was keeping tab on all the Senators and members of the House in regard to this legislation for the equalization of taxation, and I found that this gentleman was in thorough accord with the farmers and laboring people of Pennsylvania.

I am just going to quote this afternoon from the words of a member of this Board or a statement of a member of this Board, the distinguished member from Center county, Col. John A. Woodward, who served in the House with the distinguished Senator, the lower House of Representatives at Harrisburg, and was a trustee of State College and was on the Committee for many years. He said, in the years of Senator Penrose's life and work in the lower House of Representatives, in the Senate of Pennsylvania, and in the National Congress of Washington, he had never cast a vote against the laboring man or wage earner or the farmers' interest. That comes from a Democrat of the Democrats and a truthful man, and today Senator Penrose comes here in our interest, in the interest of the people of Pennsylvania, advocating good roads, and it is with pleasure that I introduce to you this afternoon, Senator Boise Penrose, the Senior Senator from Pennsylvania. (Applause).

## ADDRESS OF SENATOR BOISE PENROSE

Representing the Joint Committee on Federal Aid in the Construction of Post Roads.

Mr. Chairman, Ladies and Gentlemen: I am here for the purpose of having the pleasure of meeting so many of my constituents at this distinguished gathering, evidently taken from all over the State of Pennsylvania, because I have had the pleasure of meeting old friends here from the eastern section of the State and from all over, and also as a member of what is known as the Joint Good Roads Committee of Congress, the official title of which is Joint Committee on Federal Aid in the Construction of Post Roads. It is needless for me to say that it has given me great pleasure today to shake hands with most of you and to renew old acquaintances.

While this is my first visit to the Borough of Washington, it is not my first visit to the county, and I only regret that I have not been able to get out here more often. But I have known your distinguished Chairman for twenty-five years and your Secretary of Agriculture, I served with as a colleague in the State Senate, and he and I, according to my recollection, sat down and talked together and had a bill drafted for a Department of Agriculture several years before the Legislature finally acted and created one.

The Committee on Good Roads of Congress has been doing considerable work, recognizing the paramount importance of the issue of good roads before the American people. The Commission was created originally in the early days of the last Congress and the personnel of the Commission and the Commission itself was continued after the expiration of the last Congress, and during this winter the Commission has been in constant session, holding hearings, communicating with every Highway Department all over the United States and corresponding with foreign governments, in order to gather data as to what is being done and has been done abroad. I have had sent here from Washington five hundred sets of the preliminary reports of the Commission, which you will find at the close of the meeting, some of them under the desk and others elsewhere, perhaps. They are distributed around in the audience and I would ask those of you who are sufficiently interested in the subject, to get these hearings and preliminary reports and familiarize yourselves with the status of the matter from the point of view of the American Congress.

Now many people doubt the wisdom of Congress getting into this situation. They argue that the states ought to construct good roads in their various limits. But there is a situation growing up which makes the Federal Government take cognizance of the question of good roads and that is due to the enormous extension of the work of the Postoffice Department. The rural carrier service alone compels the Postoffice Department to consider the question of good roads. Some 40,000 or 45,000 carriers transport the mail over the rural routes throughout the country and the strength of their equipment, the number of horses they must have, the salaries they are entitled to, whether the transportation shall be by horse and wagon or by automobile, in fact, the whole question of the renumeration of the carrier and the expenditure for the service. which runs up to the enormous sum of fifty or sixty million dollars, is dependent on the question of the character of roads in the different localities.

In a section where the rural delivery is carried over a macadamized road or brick road or good asphalt road, the expense, of course, is very much diminished as compared with the expense in a section where it has to be carried over roads such as exist in many of the Southern States, where the advance in road transportation is hardly ahead of what it was a hundred years ago. In addition to that, the Parcels Post is tending in the same direction. If there is to be an enormous amount of packages of various weights thrown upon the rural carrier untimately to deliver to the farmer, the question of the kind of roads that it is to be transported over becomes at once of paramount importance to the Postoffice Department and to the Federal Government, and when we consider the short time that the Parcels Post system has been in existence and the remarkable way in which the people seem to appreciate it and to take hold of it, it looks to me as if it was only a question of time when that service alone will assume dimensions that startle the imagination, and that also brings up with renewed force the active, real business interest which the Federal Government has in the question of good roads throughout the United States.

Then there is another reason why we ought to give a little consideration to the expediency of Federal co-operation, and that is, the powerful incentive which Federal aid would furnish to the poorer states. Pennsylvania is one of the greatest Commonwealths in the country; she has been described as an empire in herself and our people can borrow fifty million dollars and appropriate five or six million dollars a year and not feel the burden. But when you take states like Mississippi and North Carolina and South Carolina and other sections of the country which do not have the resources that Pennsylvania or New York possesses, an appropriation from the Federal Government, which would be met by a similar appropriation from the State, would furnish a powerful incentive to those states getting in on the line of progress, and, as American citizens, we are not only interested in good roads in Pennsylvania, but we also want them all over the country.

Now, as I say, this Joint Committee has had before it the Highway Commissions of a great many states of the Union. We have had hearings, have met from day to day in Washington all through the winter, and we have had a large force of experts on the work connected with the National Department of Agriculture, and have got in one of the volumes that you will find here quite complete data regarding the road situation in all the principal civilized nations of Western Europe. And before the Commission is through, I beleve, and I say it modestly, because I happen to be a member of it, I think the Commission will be monumental in the character of its report; and with the data which it will collect and the suggestions which it will make, will be one of the greatest contributions which has been made to the good roads uestion in the United States. (Applause.)

Senator Bourne, of Oregon, formerly United States Senator from Oregon, and Chairman of the Committee on Postoffices and Post-Roads for a number of years, succeeding myself, is the real author of the present Parcels Post system, which is an ingenious proposition, carefully worked out, reflecting great credit on his industry and continuous labors, and he is devoting all his time to working out this subject of good roads intelligently and laboriously. He had fully intended to come out here today to open up before the people, not only of Pennsylvania, but of all the United States, his ideas on good roads and the tentative suggestions made to the Good Roads Commission, and it was with great regret that he found that illness prevented him and it was greatly to my regret that I could not have him here to talk to you about a subject with which he is necessarily more familiar than I am, because he has had nothing else to do for some months but devote his attention to this one important subject.

As a member of the Good Roads Commission of Congress, I am not committed to the suggestions to which I shall refer in a few moments, presented by the Chairman, Mr. Bourne, to the Committee, as to the nature and extent of Federal co-operation with the different forty-eight states of the Union, and doubtless Mr. Bourne will be only too willing to modify many of these views, particularly as to the details which he may have therein after the discussion develops the subject. But the suggestions made are certainly worthy of serious consideration and they have the great merit of bringing up the whole subject in tangible form, so that the people of Pennsylvania and the people of the United States and the American Congress will have something tangible to debate, criticise and discuss, and it may be that someone will come along with a better plan, but this will furnish the foundation for the discussion.

The essence of the whole proposition is, a loan by the Federal Government of, say, a billion dollars, an apportionment among the states of the proceeds of the loan to be paid the states from time to time as they raise equal amounts, the money to be expended under the jurisdiction of the State without undue interference from the Federal Government; but at the same time with the Federal Government maintaining a general Federal supervision. A Bureau of Standards, for instance, to fix the character of the roads in different sections, a staff of engineers to advise and consult and supervise, but not in an offensive way to interfere with the jurisdiction of the State.

Now, under that proposition, briefly and crudely outlined, because it would be foolish for me to go into the financial and technical details in this general meeting, when the full report is available for anyone who chooses to examine it more fully, but under this general plan, the share of Pennsylvania out of the proposed loan would be $56,000,000; that is to say, if the State of Pennsylvania authorizes the loan, gave the authority in a constitutional amendment for the State government to borrow $50,000,000, this State can get $50,000,000 from the Federal Government, and if that authority extended to $56,000,000, we would get $56,000,000.

That is a proposition well worthy of serious consideration. The States get different amounts, achoring to four factors that are considered of equal account in estimating the quota to which they are entitled. Those four factors are: Actual mileage of roads in the State, population, assessed valuation of property and area. These are the four factors, and on that basis a state like New Hampshire would get about, I think, $5,000,000; a state like Alabama would get about $11,000,000, and Pennsylvania would get about $56,000,000. Area is a factor; mileage is a factor; the population, of course, is a factor, and assessed value of the property is a factor, because the property must bear the State tax, which will be applied to the State loan.

Now, if any such proposition like this should come along, it is well worthy of thought and consideration by the people of Pennsylvania when they come to vote on the question of authorizing the borrowing of $50,000,000 by the State. Of course, many people maintain that roads can be built out of current revenue, and that is true. But we will all be in our graves and our children after us, before we get a complete system of roads out of current revenues, and I am one of those who would like to anticipate the future a little and enjoy some of the good things due to this generation during the lifetime of the generation. If we borrow the $50,000,000 and get the $56,000,000 from the Federal Government, we can practically cover the State of Pennsylvania with good roads. I do not mean through routes for automobiles or for pleasure seekers merely, but good roads all through the country that will enable the farmers of the State to carry their products to the nearest railroads and to the county seats and other places where they want to deposit them.

Our forefathers did not hesitate to anticipate the future. They borrowed what was in those days enormous sums of money to build canals or to aid railroad companies construct railroads, because they realized that good roads and transportation was the life of the nation; in fact, the early days of 1810 and 1840 are largely taken up with the history of the construction of canals and the promotion of railroads. The people were enthusiastic almost to the point of madness, in some cases, to have railroads and canals everywhere all over the United States, and we can well afford, in this generation, with the State of Pennsylvania absolutely out of debt and with the debt of the Federal Government practically of no account, in view of the enormous resources of the country, we can well afford to borrow the money for the National Treasury and for the State Treasury.

The conditions that the loan is contemplated for are also set forth in the report. One of the most important, the two most important provisions are that the State should have a Highway Department and that it should have the ability to borrow the money. Now we have the Highway Department, and in my opinion we have the Highway Department presided over by one of the ablest engineers in the United States, Mr. Bigelow, present Chief of the Highway Department. It is not theory about Mr. Bigelow. He was for a very long period the Director of Public Works in the City of Pittsburg, and you have only to look at the Grand Boulevard, Schenley Park and other improvements, all due to his ability and farsightedness, to recognize that in him you have a great demonstrator and a capable engineer, and if his health is preserved and he is able to take care of this work in Pennsylvania, I, for one, shall feel confident that it is in good hands. We have the Highway Department, and now it only remains to act on this resolution to be submitted to the people at the next election as to whether the State shall be authorized to borrow the money.

Now I do not mean, and I know a great many of the farming people and the State Grangers, have an idea that this means entering or a carnival of lavish expenditure, but no one imagines that this money is to be spent in a week or in a year. It might take twenty-five years to spend the money, but we want it authorized; in fact, the proposed suggestion of the Committee, the Federal Committee, is that no State should be given more than 20 per cent. of its quota in any one year and if it is thought that even that would lead to extravagance, it is easy to reduce it to 10 per cent., but the authority must be there and able to have the money available as cash may be required.

There is no more proper spot than this Borough of Washington for a Good Roads Convention. It is needless for me to say what you all know, we passed over it this morning, part of it, that here one of the greatest feats of good roads engineering and the earliest, also, in the United States, the Old Cumberland or Washington National Pike was inaugurated, and in the opinion of many people, there was no material structure in all the land that did more to harmonize the country and it has even been said, to preserve the American Union than the construction of the National Pike westward to the Mississippi. (Applause.)

That is an object lesson and we do not have to go any further than this beautiful and substantial town here and study the history of the great National highway that passes down one of its main streets, to be fully alive to the importance of good roads and transportation. It is estimated that the saving in the wear and tear, in equipment of wagons and horses and all the elements that enter into transportation over roads, would pay three per cent. or nearly $4,000,000,000. Well, if that calculation is anywhere near correct, the Federal Government could easily afford to borrow, not $1,000,000,000, but

$2,000,000,000 or $3,000,000,000, and save the farmers of the country and the rural carriers and travellers in general, the wear and tear on equipment and the delay in carrying products over the roads. France has spent in 150 years a billion dollars and a half to construct good roads. My recollection is that France has in the neighborhood of 340,000 miles of good roads and in that great republic there are ver 70,000 patrolmen walking the roads every day, keeping them in repair.

Of course, the problem in America is immeasurably greater, but it is not too great for the wealth and genius of the American people to meet. The question of good roads has always entered as a vital question in the prosperity of the community. A city becomes commercially great on account of transportation facilities, and to take them away or deflect them, the walls decay and buildings fall to pieces and commercial supremacy leaves the town.

The history of the country is wrapped up in the question of roads. We recall how in the early days we read about the great paths or highways which the Indians had all over the Continent. They went up the Hudson, and up the Mohawk, and across the watershed down to the Great Lakes, and crossed the watersheds of Ohio and Indiana among the mound-building Indians of the Central West, and we have remnants of them today, and in many cases the railroads followed the routes laid down by the original settlers on the Continent. And then we have the routes made by the great game animals, especially by the buffalo, who, in his migrations, curiously enough, instinctively, in crossing the mountains and in selecting the fords over the rivers, selected in the course of ages routes to which he adhered as scientifically laid out, apparently with a view to grades and acclivities and shoals across the fords, as could be selected by the most skillful engineer graduating at Washington and Jefferson or any other college in the land, and these routes have, in many cases, been adopted by the railroads and by those laying out highways, and are today the same routes are traveled by civilized commerce that were once traveled by the buffalo and the Indian.

Then, as we go on in the history of the country, we record the great roads which passed in this vicinity, the road known as Washington's Road, or, I believe, named for an Indian chief, Nemacolin's Path, Braddock's Road and the Old Glade, or Forbes' Road. And then, after the Colonial days, showing how identified the road question is with the history of the country, we recall how Boone's Wilderness Path took the immigrant, the hunter first and the missionary, and then the immigrants seeking new homes, into the western country and the conquest of the West follows the line of Boone's Wilderness Road and the great military roads later on built by the Government in the Mississippi Valley. And so Pennsylvania, if these roads were constructed, would reach a higher point of civilization, and there would be a cheapening of the cost of living of everything than we consume and a perceptible lightening by a decided percentage in the labor of men within the Commonwealth, if good, clean roads, free from monopoly, open to all, rich and poor alike, covered the hills and valleys of this great State.

There are other reasons which forcibly impress us with the necessity of good roads. There is no State in all the Union richer in historical suggestions than in the Commonwealth of Pennsylvania. If we had good roads these wonderful places would be thrown open to the traveler from all over the United States and they would come from the West and from New England to visit the beautiful scenery and the historical spots in Pennsylvania, as tourists and as travelers, instead of going and spending their money, as many of them do now, in foreign lands. There is no State in all the Union that is richer in historical associations than is our own. Here, at the head-waters of the Ohio River, was fought one of the great battles near the City of Pittsburg, participated in by George Washington, and where Braddock was slain in the French War, which decided whether the Latin race or the Anglo-Saxon should dominate and control the American continent.

That certainly is a significant point that every patriotic American would like to visit. And on the other extreme of the State, as you know, we have Independence Hall, where the Declaration of Independence was declared, and where our country established its independence and freedom. And within its limits is that great field where the high-tide of the Rebellion was stopped and where the Union was saved. I refer to that military field at Gettysburg, the fiftieth celebration of which will be celebrated in July, a field upon which millions have been spent to mark the points where those heroic men fought and died. Why, people spend hundred and thousands of dollars to survey the Battlefield of Waterloo, to see nothing but grain fields and corn fields. But here every line for twenty-five miles of a great battle, one of the battles of the world, is marked out at an expenditure of millions of dollars. And if that wonderful and beautiful and sacred point was made accessible, thousands of people would visit Gettysburg every year to renew their patriotism by surveying that wonderful scene.

Every valley and hill and mountain in Pennsylvania is filled with historical associations of notable or important events, and while these are perhaps, sentimental reasons and getting a little away from the main issue, yet, after all, they are real, and business and commerce and patriotism all unite in making the American people stand together and work zealously and consistently until Pennsylvania and the whole country is covered with a system of good roads.

The work has been begun in a great many localities and great success has been achieved. It is evident to anyone who travels over Pennsylvania that decided progress has been made in the construction of good roads. I noticed coming along from Pittsburg this morning in the trolley car the excellent brick roads in many parts of Washington county. Every mile of improved road is an education to the farmers and the people living in the vicinity. It is only a question of a short time, after looking at the miles of good roads, that they will insist on having every part of the road improved and good.

I am glad of this opportunity, ladies and gentlemen, to meet you here today. This county is one of the greatest in the State, with its varied industries, its fertile farms. everything on the surface and every kind of wealth under the surface, for the use and the enrichment of man. And if I have been able to enlighten you on the Federal phase of this question, and if the results shall be that the people of Pennsylvania will advance in steady progress to bring about a condition of good roads in the country, I, as a patriotic Pennsylvania, will rejoice as much as any of you. (Applause.)

The CHAIRMAN: Now friends, we have two or three other speakers whom I would like you to hear. In making up this program, Mr. Martin has desired that our Commissioner of Roads be with us today. We have with us a representative of the Highway Department of Pennsylvania. We had hoped to have Mr. Bigelow with us, but he is not well; he is confined to his room and it is impossible for him to be here. I had hoped that he would be able to meet you. I would just like to give you a little history, just a word.

Before he accepted the position, after it had been offered to him, he asked me the question, "What do you thing, George, of my accepting that position?" I said, "Mr. Bigelow, you have made your mark in making roads in Allegheny county, and your name will go down into history. You are undertaking the biggest job ever offered to any one man in the State of Pennsylvania. If you wish to go on and try to make a new record the field will be open to you." And I believe that if he lives and has the opportunity, he will bring great results in this Commonwealth of ours. He cannot be here today, but he has here a representative, a gentleman who graduated from this good College that we visited this morning, a civil engineer of Statewide reputation. The only thing I can say about him is that he gets disappointed sometimes when State College defeats their football team. He kind of loses his nerve then, but I know he will not lose it this afternoon and I take great pleasure in introducing Col. Foster, Chief Engineer of the Highway Department, who will speak to you on how to construct roads or the construction of roads.

Colonel Foster spoke as follows:

## ROAD CONSTRUCTION

By COL. S. D. FOSTER, *Harrisburg, Pa.*

Mr. Chairman and Members of the Institute: I want to bring the greetings of Mr. Bigelow to you. He had expected to be with you but illness at his home causes his absence.

In taking up the question of good roads, I am going to confine myself to the Sproul Road Bill, the operations of the Department and the road construction which they will maintain in the State. Our Department came into being through the Sproul Road Act, the first of June, 1911. It consists of the Commissionr, Mr. Bigelow, Mr. E. E. Jones, the Second Deputy Commissioner, Mr. Joseph W. Hunter, the other Commissioner, and various assistant engineers of roads and bridges. The State, after Mr. Bigelow had accepted his position, was divided into fourteen districts. Over each district was placed an assistant engineer. This Act directed us to survey 296 routes. These routes have been surveyed and we find, instead of 8,000 miles, which was contemplated in the Bill, a total of 8,800 miles of road. In this State, there are 90,000 miles of road all told, giving the Highway Department control over about one-tenth, of a little less than 9,000 miles. We find that of this 9,000 miles, about 850 had already been constructed, some by County Commissioners, some by the State Highway Department and some by the Township Supervisors.

Since the inauguration of Mr. Bigelow's administration in the Highway Department, 196 miles of road have been completed. There are at present under construction about 140 miles. These roads are of several different types, according to the traffic and according to the locality in which they are. We are building today four types of road. In the rural communities and in the parts distant and lightly traveled, a plain, macadam road; this road is built from the native stone, if it is hard enough, and we find in quite a few of the counties, proper stone for the construction of these roads. As we near the communities of a little larger size, it has been necessary to add asphalt or some dust layer to these macadam roads. Closer in and on roads where there are no grades, we have placed a concrete foundation with an asphalt concrete top. This road, I believe, will last for twenty or twenty-five years if properly taken care of. In the communities near the boroughs connecting cities, we have built brick roads; this, in communities where we have extra heavy travel, that is, travel of an extra heavy nature. These brick roads we calculate to last twenty or twenty-five years. The roads which we constructed during the last two years have cost on the average about $16,000 per mile. In some of the counties, like Centre, Cambria, Blair, Berks and a dozen others, we have limestone. In these limestone counties, we can construct roads and have constructed them with our own forces as low as $3,000 per mile. It is the intention of the present administration to construct roads in this county of limestone, inasmuch as they can be renewed completely for less than a permanent road of asphalt or brick would cost in the way of interest.

In taking up the maintenance question, the Department was charged with the maintenance of these 8,800 miles of road on the first day of June, 1912. The Commissioner had fifty superintendents at his disposal, no machinery and no funds. Probably 90 per cent. of the 8,800 miles of road have not been touched by the township supervisors for at least 18 months. He had $3,000,000 in the Sproul Road Fund. He took from this fund $1,000,000 for maintenance. He had to go to the Township Supervisors and the County Commissioners and ask the loan of their machinery, because our Department had no money with which to buy it. That was one reason why last year there was more or less complaint on account of the dirt roads not being maintained. With the present year, the present Legislature, now in session, has recommended an appropriation of $1,800,000, $1,400,000 of which is to be used in the maintenance of the Sproul Roads, $400,000 of which is to be used in the maintenance of the State Roads, roads which had previously been constructed by the Highway Department and which the Township Supervisors in many instances have allowed to decay.

We have today, fifty Superintendents in the various counties, each Superintendent under him having a general foreman in charge of 80 or 90 miles of road. The 80 or 90 miles of road have been divided up and apportioned out to the various residents of the district for maintenance. There are at present in use in the Department in the neighborhood of 2,000 drags. 7,000 miles of the 8,800 miles have been practically rebuilt. The old dirt roads have been shaped up, have been crowned, drainage has been placed under them instead of over them, and a great many of the old stone roads which had been allowed to go to ruin have been resurfaced. We have today 50 road rollers working on our State roads. With each of these rollers we expect to carry through 8 miles of work during the present season, giving a total of probably 400 miles of reconstruction of these old stone roads.

On the maintenance force we have covered today and reshaped practically the entire distance, and I have myself traveled for a day at a time in the central and lower central parts of our State on dirt roads that were as good and practically better than most of our city.streets. You men here who are Township Supervisors will be interested in what Mr. Jones, who is to follow me, will tell you in reference to this dirt road maintenance. We expect some day to have our Superintendents, men to whom you can go for advice as to all the ills that you have in your township. When that day comes, I think, instead of having 8,000 miles of road, we will have 90,000 miles of road, over which we can travel for six to eight months of the year in perfect comfort. I think, Mr. Chairman, that is all I have to say.

The CHAIRMAN: I now have the pleasure of introducing to you a getleman who comes from the northeast section of Pennsylvania, from Susquehanna county, known to a great many of you as the home of great men; and the greatest I knew was Joshua Grow. He grew up in that country. But there grew up one after him who is trying to do his very best for the people of the State. He is trying to get an appropriation to help aid the townships throughout this Commonwealth. He has served for terms in the Legislature from his county. He is Chairman of the Committee on Roads; he is making it a study; he is giving the best efforts of his life for your benefit. He comes here today away from his labor at Harrisburg to speak to you a little while on the question known as "Dirt Roads." I have great pleasure in introducing to you the Hon. Edward E. Jones.

Mr. Jones addressed the Institute as follows:

## IMPORTANCE OF DIRT ROAD BUILDING

By HON. EDWARD E. JONES, *Harford, Pa.*

Mr. Chairman, Ladies and Gentlemen and Friends: I say "friends," for you look like my kind of people that I have lived among up in Susquehanna county. I think there are some of you here, perhaps.

At the outset of what remarks I may make I want to set myself right and set the cause for which I speak right, in correcting perhaps a misapprehension which is sometimes prevalent, that because we make a hobby of dirt roads we are in any sense opposed to the best type of roads which are being constructed by our splendid Highway Department today. I want to make that perfectly plain, that we are in perfect accord with the construction and the work that is being done along that line. You cannot build the roads any too well; and it has been my pleasure and privilege, as a member of the House, to stand for that legislation which we have in the Sproul Bill and other bills which have to do with the construction and maintenance of just such roads as our eminent civil engineer from the Highway Department has told you about today.

I want to make that plain for several reasons which will probably develop later. We want to get away from the word "dirt" road or mud road. They are pretty apt to say, "There is one of Jones's mud roads." We want to get away from the word "dirt" or "mud" and distinguish those roads by the name of township roads. You see, under the system which we are getting into shape in Pennsylvania, we have these 8,800 miles of main highways taken over by the State, known as State roads, to be built and maintained forever by the State itself at the expense of the State. Then we have the State Aid roads, which are built in connection with the counties and townships, the State paying one-half of the expense, the county one-quarter and the township one-quarter. Then we have 80,000 miles of road, which are maintained entirely or principally at the expense of the townships, as has been the case heretofore, but we want the State to help in the maintenance of those and the construction of those township roads, and I want to call them Township Roads here. And am very glad that our distinguished United States Senator has preceded me, and in connection with the remarks which he made as to the Federal Aid to the States, he spoke of how in some parts of our nation there are those States which are financially weak and unable to do for the highways in those states what Pennsylvania is doing for hers.

In other words, the idea is for the strong to help the weak and that is what we want. We want the great Commonwealth of Pennsylvania to help those of us who live in the sparsely settled districts where we don't have sufficient money to maintain or construct good township roads. Now these township roads may not necessarily, although under the supervision of the township, be merely township roads. In many parts of our State we have material, such as stone, in some counties lime block and other materials, to construct an inexpensive stone road or partially permanent road, which could be rightly termed an improved road by the township, and what money we get from the State we want to put into such kind of roads, with our native helpers to be paid by our native Supervisors and using our natvie material. So those are the kind of roads which we want to build under State Aid and why do we ask for State Aid in our township roads?

First, I want it, my friends, for the equalization of taxation. That is our principal argument in favor of such aid for these township roads. We base our claims precisely on the same claims that were made originally in asking for State Aid to our public school system. It is a parallel case precisely. We ask for the State to come in and help us in our rural townships in the construction and maintenance of our township roads, for the same reason that we asked the State to come in and help us in our public school system in providing better schools in our country districts; and the State appropriation for schools is not confined to high schools alone and to our colleges but the very smallest country school district receives aid from the State, and rightly, too; and for that reason we ask for State Aid for the country roads which are way back on the hillside, for the equalization of taxation; that is the principal reason. We don't deny that fact, that we ask State Aid for that reason, for we find, in consulting the reports of the Auditor General for the year 1910, that the aggregate appraised value of real estate in Pennsylvania for that year was four billion, six hundred and thirty-five million, five hundred and forty-seven thousand and some odd dollars. The taxes collected on that amounted to $77,346,540, or an average of a little over 16 mills. We find also in the same report that the appraised value of personal and corporate property in Pennsylvania was nine billion, two hundred and five million, eight hundred and forty thousand and some odd dollars, or, in other words, twice the value of real estate in Pennsylvania, and we find that this property paid into the State as taxes, $14,516,588, or in other words, about 3½ mills.

Now, in short, my friends, the difference is between taxes to the extent of 16 mills upon real estate and in round numbers, 4 mills upon personal and corporate property. It is true, that we who own real estate do not pay money directly into the State Treasury for taxes, but nevertheless we pay taxes, even if they are for our local support, for our local benefit; they are taxes upon our property and we feel that to help to equalize this great difference between the tax on real estate and the tax on corporate and personal property, that the tax on corporate and personal property should be increased to some extent, to an extent sufficient to revert back to the townships three million dollars or a million and a half dollars, which would provide about $20 per mile to the townships to help them in the construction of better highways in those townships. The principle is exactly the same as has been followed in the school appropriations, and we are asking for the same principle to be laid down now and become a policy of the State in its attitude toward the highways back in the country districts.

Then we have as another reason that the type of roads which we are now building and which are being constructed by the Highway Department at the present time, as described by Col. Foster, on the 8,800 miles which they are maintaining and putting in proper shape as earth roads, and all of you know about those roads, those roads extend all over the Commonwealth, they are putting them up in splendid shape, and that is an object lesson to us that we want our roads in that shape. But it is a physical and financial impossibility in many districts of Pennsylvania to raise money by taxation to fix our roads in that way. We want that kind of roads.

I will take, in connection with the system which was made as to the taxation of Pennsylvania as a whole, to corroborate that and to know that it was true, I took the pains to communicate with the Board of Supervisors in every township in my county; I put the question and got reports from them as to the valuation of their real estate and the taxes which they levied, and I got for the average of our county as follows: For roads the taxation in Susquehanna county, the millage is 12½ mills; for schools, 15¼; for county purposes, 8; for poor, 4, making a total of 40 mills tax. I know that's a revelation to you who live in Allegheny county. I was down in Lancaster county some months ago and it was a revelation to them that these counties in the northern tier were so heavily taxed to maintain their local government. I want to be fair in this matter and that is to say that in the valuation of our property, it is only valued at half, at about half, the assessed valuation is about half, so as to be perfectly fair, we want to cut the millage in two to bring it down to 20 mills, so then to be perfectly fair we will bring it down to 20 mills. Susquehanna county is only the average county, and there are some worse off than we are and many much better off than we are, but it is an average county, and there is not a township in that county but what levies 10 mills for roads, the full limit, and then goes to our court and asks for an additional millage for the construction of roads.

Then we have another excellent reason, which is going to be more and more a good reason for State Aid, and that is that when we get these principal roads constructed, of a high type of construction, which we will have in a few years, especially if we can get the money to do it by this fifty million dollar bond issue, we all know that where there is a good piece of road we will drive out of our way for miles to get down to that piece of road and that means, of course, additional wear upon that road. If the township roads are improved, if they are made better, it is a matter of economy for the Commonwealth to assist those townships in making their roads better, so that those of us who live off the State highways will travel on our own roads and there will be less travel upon the State highways. This may seem a trivial matter, but it is not trivial, for every time a vehicle goes over a road you take some of the life out of that road, and it has been estimated by a friend of mine, and this thought came from this friend, who was Senator of Lancaster county; in his own words he claims that it will save the State on the wear and tear of its own State highways, a million dollars a year if we can have better roads back in the country, and we are only asking for a million dollars and a half.

Then another reason why we ask for State Aid is, that by the State giving financial aid to the townships, the State then has a right to come into the township and say to our township supervisors how they shall spend this money, not in a dictatorial fashion. And we have a Highway Department, which is organized, which is filled, or will be, in a few years, with competent road builders.

I want to say, my friends, that I think that considering the short time since the reorganization of the Highway Department, that the progress they made in organization is something wonderful, when you consider that Mr. Bigelow took hold of this work in this Department without any practical road builders and had to take green people who had no training as to road construction, had to take these men and make road builders out of them; the wonder to me is that they haven't made more mistakes than they have. But that is rapidly disappearing, because the men are being trained all over the State of Pennsylvania and you are going to have trained road builders. Why not let those men come into our townships and tell us how to do the work? They have the experience and the knowledge and we can get not only money from the State, but some of the gray mater from these people who know how and thereby assist us in the construction and maintenance of our township roads.

Another reason why we ask State Aid is, that this is the day of automobiles and they are everywhere over the State. The State taxes these people by a license; this tax goes into the State funds and is expended on the roads; yet these automobiles travel on all the roads of the State, they travel on our township roads and in a sense raise havoc with those roads. The State gets this money from the automobiles and we feel that some of it should be turned over to us to help us maintain the earth roads. Not only earth roads; we want them to be made of stone just as fast as they can be and want the State to aid us in this work.

There is one bill which has passed the Legislature recently and has been signed by our Governor, known as the Supervisors' Convention Bill, which, to my mind, will mean a great deal to the country districts of Pennsylvania. It provides for the holding of at least one annual convention of the supervisors of every county, either at the county seat or principal town, wherever they may choose, and that those supervisors shall be paid for attending that convention and that at that convention the county commissioners are to provide a sum not to exceed $175, to be used for getting to that meeting practical road men who will tell us how to perform our work, tell the supervisors how to perform their work and duties as supervisors, and thereby I believe that in a few years we will find that this one bill will mean the improvement of our township roads to a great extent.

Now, I am very proud to have been connected with this movement and to have done what I could, in a small way, these several terms I have served in the Legislature, toward the improvement of the roads of our Commonwealth. The time has gone past when any man needs to be argued with as to the benefit of good roads. We will agree upon that. I have seen the time when we had to argue that, but we don't any more. We all want them. The question is, how to get them and to get them as quickly as possible, in our own lifetime, as Senator Penrose said, we want to ride on these roads ourselves; we want to have some benefit from them while we live and our children after us should have some benefit and will have the benefit of it, but we want some benefit in our own generation, and I am very proud to be associated with the present administration in the State of Pennsylvania, with our Governor, whose heart and soul is back of this movement for good roads in Pennsylvania and whose administration will go down in the annals of Pennsylvania as the administration, which initiated and gave such a splendid start; and I hope not only a start, but before he ceases his duties as Governor of Pennsylvania, I hope to see many, many hundred of miles of the best type of roads in the State of Pennsylvania. I am very glad to be connected with that administration, with this movement and hope that we can connect up with that—take the next advance step and connect with that system the townships of our State, the township roads, the township supervisors, and connect them up with our Highway Department, and thereby have, to my mind, if I am competent to judge from the study of all the States in the Union as ta road construction, Pennsylvania will lead them all in the most magnificent system of public roads of any State in the Union

GOVERNOR TENER: Ladies and Gentlemen: I take it that this is more or less of a family gathering here, from the State point of view, and that the hard and fast rule which usually prevails in strictly parliamentary bodies will not be held against me for speaking twice on the same subject. But I am particularly interested in the object and the purposes of this meeting. True it is, as I said before, I am not a farmer, and yet, in my work at Harrisburg I come in close contact, not only with many of the farmers, but with all those things in an executive way that interest the farmer, and I want to know and would like to know just what has been discussed at this meeting. I would like to ask of you, Mr. Hutchison, or Mr. Martin, or the Secretary here, or Mr. Surface, if these gentlemen, coming from remote distances as well as those at home here, know just what is being done by the State for the farmer; how the Legislature is endeavoring at this Session, as it never did before, to meet the wants of the farmer? We all realize and we do not need to be farmers to realize that the happy-go-lucky way of running a farm in the old days is now out of date, and that you must at this time apply the proper scientific and sanitary measures and rules and all of that for the proper conduct and for the profitable conduct of your farm, and many farmers there are today, I am sure, who have not had the advantage of gaining that scientific knowledge, many of you have not been through State College, many of you have not had the opportunity of gaining all that, and yet that knowledge is at hand, that knowledge is free to every farmer and everyone interested in it in the entire State.

Up until this time, the Department of Agriculture was somewhat handicapped in disseminating that information, but now, with an appropriation and with a bill passed expressly for the purpose, today we feel that the State Government and all the Department of Agriculture means in helpfulness to agriculture and to the farmer, is at your disposal. You are familiar with the splendid work being done by Dr. Surface in his Department and its far-reaching and splendid beneficial effects, and today we are ready to carry that right to the farm, and so, if there be any trouble with your planting, with your crops, with your soil, with your trees, you have at hand at your call, free by the State, the expert who will come to your door.

I want to know if that has been discussed, Mr. Secretary, and if everyone here is perfectly familiar with that advantage which they now have? I would like to know if you have discussed, for instance, the State Fair proposition, which is recommended in my message and which was asked for by many of the farmers, although there is some opposition now by officers of local fairs, but I think that that opposition should not prevail, for the reason that the greater the fair, the greater the exhibition, the more people will come to it and the further its good influence will be radiated throughout the State. In other words, if you have a good State Fair in Pennsylvania, you are bound to have good local fairs, because the prize exhibits of that State Fair will go among these other fairs and all the things that are of interest and that are of benefit to the farmers in a real, practical, genuine way, the State Fair is committed to and is endeavoring to accomplish through the Agricultural Department and other Departments of the State.

I am asked at this time that the program be filled up and concluded by one who usually pronounces the benediction on occasions of this kind, a live wire from your adjoining county of Allegheny, one of the County Commissioners, who has had a very great deal of experience in road building and in contracting for roads. In that county of Allegheny, they have built almost entirely of themselves and with their own money, more than 400 miles of improved roads, and have within the confines of that county, by purchase as well as by construction, altogether some 500 miles, half as much, nearly half as much as the entire State of Pennsylvania. I take great pleasure in introducing one who is, I am sure, known to most of you, the Hon. J. Denny O'Neil, of Pittsburg.

MR. O'NEIL: Mr. Chairman, Ladies and Gentlemen, Governor Tener and Senator Penrose: I was one of the few fellows over in Allegheny county who made a hard fight for Governor Tener and I have never for one moment regretted that he was elected Governor.

GOVERNOR TENER: I want to remind the Commissioner that this is altogether a non-partisan gathering.

MR. O'NEIL: I can speak my mind freely, ladies and gentlemen, because the very last bill that Allegheny county was interested in, was signed by the Governor the other day, and when his term as Chief Executive of this State is over and he retires from public life, he will go down into history as one of the greatest Governors Pennsylvania ever had, and I say that from my experience with him as a public official and a business man and from several months' experience in Harrisburg trying to secure legislation that would be for the benefit, not only of Allegheny county, but for the benefit of the whole State of Pennsylvania.

I have absolute faith in good roads. I have the distinguished honor of being a member of the Board of County Commissioners of Allegheny county and that county contains one-sixth of the total wealth of this whole State of Pennsylvania. It is a county whose assessed valuation is greater than that of Maine, New Hampshire and Vermont combined. There are 18 states in the Union that have a lower assessed valuation than the county of Allegheny and from a county like that you can expect big things. We have at the present time 450 miles of roads that were constructed by our county. We have about 50 miles of roads that were toll roads and that have been taken over by the county and we have spent in excess of $11,000.000 to build those roads, and I want to say as a business man and as a banker, that it is the best investment that Allegheny county has ever made. I know farms in Allegheny county on some of our improved roads, that two or three years after we improved those roads, they not only doubled in value, but in some sections where the land came into use for residence purposes, the value increased ten times the price they sold at previous to the road being constructed. That is the best investment any community can make, because when you construct good roads in the vicinity where farmers live, you are going to retain those farmers and going to get a better class of farmers. Why, men, one of your own members here said that the future of this country depends upon the boys who come from the farms, and as a practical politician and as a practical business man and as a man who has had great deal of experience in our cities, I want to say that every word of that is true. Why, if it were not for the people who come into our city to balance us up and keep us in the straight path, if it were not for the farmers, God pity this great State and this great nation of ours.

Now, I am interested in good roads and I have had a good deal of experience and we hear some of the farmers complain about the high cost of constructing roads. We have maintained a steady road construction in every state in the Union and there are no other conditions that confront us when we go to build roads just the same as those in Pennsylvania. We have a peculiar soil, cut up by mountains and hills and rivers, and we have heavy traffic, and it is natural that our roads should cost more to build because we have got to build them better than in most of the states of the Union. In New Jersey, where they are building sand roads, or out in the West, where they take a road machine and round up the road in the center, it's no wonder they can build roads for $300 a mile; but in Pennsylvania, to build a road that will last and meet the requirements, you have got to spend from $14,000 to $20,000 a mile, depending on the construction of that road. But no matter what the road costs, it is the best investment for the people that they can possibly make. The form or type of road has been described by Mr. Foster and other gentlemen and I believe it has been said that we have practically arrived at the conclusion that the roads in the future must be on a concrete foundation in most places and in most sections. A macadam road will be built where the country is pretty well built up and a bituminous road in towns and in the vicinity of cities and boroughs. The construction of brick roads is another thing we have been greatly interested in and I have been going through the county and State to some extent, investigating it.

It is a strange phenomena to find so many farmers who are opposed to this bond issue for the construction of roads by the State. I cannot imagine why any farmer will reach a state of mind where he will go and oppose that project. I want to tell you, men, that when those roads are constructed they are going to be constructed and maintained by the corporations and it is right that they should be, it is right that they should keep up the roads of this State. As Mr. Jones has said, they have not paid their just proportion of the taxes and if we construct these roads and leave the corporations to pay for them, you are going to benefit and it is going to equalize taxation. That will make it fair, and I tell you, if you would only come over into Allegheny county and investigate what the roads have done there, you will not be misled by what any farmer politician may say in regard to the construction of good roads. You will not only vote for the bond issue and good roads, but you will do everything you can to get your neighbors and friends to do so.

I have congratulated the State on having such an excellent Governor, and I want to congratulate the State on having such an excellent Highway Commissioner and such an excellent State Road Engineer as Mr. Foster. It isn't much wonder that they are good, because they were trained out in Allegheny county, and when they wanted a Highway Commissioner and an engineer to construct the roads, they came out there and took them from our county. I am glad they did, because they have got a bigger field to work in, and our not only good men, but have the ability to construct your roads right, and they are absolutely honest and everything they do will be open and above board and for every dollar they spend you are going to get a dollar in value in the roads.

I don't know of anything else I could say to you, gentlemen. I believe you understand the conditions better than we of the city, but don't be misled by any story, no matter from what source, that the farmers ought to oppose this fifty million dollar bond issue. One of the reasons why they have been opposing it in the past is the false impression among so many that all politicians are dishonest. I am not a politician, I am a business man, but I have held political offices and have come in contact with the politicians of this State, and they will average as high, if not higher, than any other class, and it is a shame and will result in evil to our county if we do not stop this unjust criticism, particularly on the part of the yellow journals, this criticism of every man who holds public place. There are papers published in this State that are a menace to the State and the nation, and the citizenship of Pennsylvania ought to rebuke the stories sent broadcast in an attempt to tarnish the name and reputation of every man that holds a public office. If you compare the public men that I know with the men who are the authors of those stories and the publishers of those papers, you will find that there is no comparison at all between them. Some of those fellows are so low down, so degenerate, that I will not say what I think about them; you can imagine the rest.

The CHAIRMAN: I tell you, when a man strikes Billy Sunday's trail he just goes all over him.

Now friends, we have had here a feast of good things on this road question, discussion that will affect not only the audience present here today, but will go out all over this Commonwealth and this nation. We have taken a step forward in this important work. We've got a good friend here that's my boss, but I am his today. When he gets a chance he takes a whack at me. Now, I just want my good friend, one whom I love and esteem, Secretary Critchfield, to say just a word at the close of this meeting. Give him your close attention. He is a farmer from Somerset county, the place where yesterday or the day before, he stated it was a land overflowing with milk and honey.

SECRETARY CRITCHFIELD: When I was coming up the road day before yesterday, I heard two gentlemen talking about some of the products of this section of country and became very much interested. One said to the other, "How much are you getting a gallon for your maple syrup?" and he said, "Seven dollars." Well, then I became still more interested. I thought here is the greatest market for Somerset county that has ever opened anywhere, and I listened intently. They were sitting a little distance from me and then one of the men said, "That is, when it is bottled in Bond." And then I began to realize that they were taking the names that we apply to our good things and applying them to some other things in some other sections of the country.

Now, I am glad to have this opportunity to just say a word at the close, because I want to answer the very pertinent question that was asked by the Governor. The Governor told us at the outset, when he began speaking, that he was not a farmer and didn't know that he ever would be. If I had not already known that he was not a farmer, I would have known it after he said he would like to know whether the farmers knew what the Legislature was doing. I want to say to you that there is no class of citizens in the State of Pennsylvania or any other state that keep as close a watch upon their representatives in the Senate as well as the General Assembly, as the farmers. And I will venture to say that there is not, from Susquehanna, away off to Greene county in the southwestern portion of the Commonwealth, a farmer to be found, but what can tell what is going on at Harrisburg today.

GOVERNOR TENER: Wise man.

The SECRETARY: Thank you. However, to answer your question further, there has been nothing said with relation to these matters in this meeting. We have had the program to follow out and one of the items in the program, I am not sure whether it was mentioned in the printed program, was the appointment of a Committee on Resolutions, and if the men who have not been doing their duty in the State Legislature or the National Congress, escape that Committee, they will do well. There is no question but what the Committee on Resolutions will give expression to the sentiment of this meeting with regard to what has been done by the present Legislature. We appreciate, and I know I am voicing the sentiments of all here, which will be expressed by the Committee on Resolutions —I know I am voicing their sentiments when I say that we not only know, but we appreciate beyond expression what the General Assembly is doing for the farmers of the Commonwealth and what your Excellency has been pleased to give your executive approval.

It has been a very great pleasure to me to be here and I have been more interested than I can tell you in listening to these excellent addresses on this topic that is so full of interest to all of us. I shall go away with very pleasant recollections of this meeting and the opportunity it has given me of renewing acquaintance with some of my old associates in the agricultural work of western Pennsylvania. I want to say that, before the adjournment, I hope you will give an opportunity to one of the attorneys of the town, Mr. Eagleson, I believe, who has a word to say in behalf of the Reception Committee of this City.

The CHAIRMAN: I want to say to the Governor that in the beginning of our session, when the Board of Agriculture met, we discussed and were very thankful to you for signing the Pure Seed Bill. It is a measure that took six years of hard work, as Mr. Jones knows, to get through the Legislature, a bill of the kind that you have signed, and they have been very thankful to you for it. Now I want to thank these good people of Washington county for the interest they have taken in this meeting, and to you people who have come out here today to favor us with your presence and listen to these good addresses on this great subject that lies so close to the hearts of the people of this Commonwealth, I hope you will take the message home with you and discuss it among yourselves, you Institute people, you gentlemen who go out as instructors, that you will go out as upholders of good roads throughout Pennsylvania and will do your part. I see the concrete people here and I hope they will go out and say a word for Pennsylvania; some of you come from Iowa and other places, but you will see we are awake on this subject. Now we will have a word from the Chairman of the Local Committee here, Mr. Eagleson, I believe, is the name.

MR. EAGLESON: I haven't much to say, except to say that the Automobile Club of this town and the Country Club, who are interested with the Convention delegates and so on here in the question of good roads, are willing to help out in this matter, and this evening, when we have our distinguished guests here, the Country Club has extended an invitation to Governor Tener, Senator Penrose and those with him here, to take dinner at the Club this evening at six o'clock, and have provided automobiles to take them out. Immediately after the dinner, we have also endeavored to have a number of automobiles here at the Court House, to leave about seven o'clock, and we extend an invitation to all of you to come out after dinner and receive. We are sorry we cannot take you all out there for dinner, but the conveniences are not such that we can do it. We want to take a number of the delegates to the Country Club and wish you all to come. Those we could not provide automobiles for and who wish to come, can take the trolley car at seven o'clock and get off at the Club, and we would like to have as many as possible come out to the Club about seven o'clock and meet the Governor and those with him.

The CHAIRMAN: Director Martin has a word.

DIRECTOR MARTIN: Now my friends, you have observed during the discussions to which you have listened during these two or three days, that I have been a silent listener, edified and instructed along the lines of highway improvement. Now, at the hour of closing, honored as we have been this afternoon by a visit from our good Governor and our Senior Senator and these gentlemen who have come from near and far to honor us with their presence,—now, as we close, I invite the audience, our county managers, our lecturers and others, before they leave the house, to come up and give these honored visitors the glad hand of welcome.

A Member: Mr. Chairman just before you close, I would ask whether it would not be well if the Committee on Resolutions couldn't be ready to report at the close of the night session?

DIRECTOR MARTIN: The Committee on Resolutions will offer their report at the opening of the evening session.

(The meeting then adjourned, afterward the audience formed in line and shook hands with Governor Tener and Senator Penrose.)

Washington, Pa., May 22, 1913. 7.30 P. M.

Mr. A. J. Purdy, Imperial, Pa., Chairman.

The CHAIRMAN: The first thing in order this evening will be the report of the Resolutions Committee.

MR. JOEL A. HERR: Before the Committee on Resolutions reports, I would like to offer a resolution.

The CHAIRMAN: Just hold it, please, until after the Committee reports.

MR. JOEL A. HERR: I think perhaps it should be placed before the Committee and if they want to incorporate it in their report, they can do so. Their report is final. I don't want to make a report after the Committee has reported.

The CHAIRMAN: Well, perhaps their resolution would cover yours.

MR. JOEL A. HERR: Well, if it does, all right, but mine should in any case be referred to them.

The CHAIRMAN: We are ready for the report.

Prof. Menges, Chairman of the Resolution Committee, then read the report, as follows:

## REPORT OF COMMITTEE ON RESOLUTION

1. *Resolved,* That we, the State Board of Agriculture and the Farmers' Normal Institute do hereby express our hearty appreciation and extend our sincere thanks to the committee of citizens who have arranged for our comfortable entertainment during our stay in this city; to the Board of Trade, for furnishing us with the commodious hall for holding the sessions of this Institute; to the Agricultural Society for throwing open the Fair Grounds for our visit; to the Street Railroad Company for transportation to and from these grounds; to the Grange of this county for the part taken in arranging for our comforts and to the Press of this City for its full and well written reports of the proceedings of our meetings.

2. *Resolved,* That we congratulate the Department of Farmers' Institute in obtaining, and that we thank the Legislature for passing, and the Governor for signing, the Bill appropriating $40,000 for the employment of demonstrators and councillors to apply with the farmers, the best approved practical, scientific methods of agriculture, horticulture and in the application of the various activities of the dairy and animal husbandry adapted to the various climatic and soil conditions of the State; and further, That we earnestly solicit the co-operation of the County Chairmen of Institutes and farmers generally, in assisting the Department and the demonstrators in the development of this work. Resolved, That we earnestly request the support of the Legislators of the various counties for a

further appropriation of $55,000 for the maintenance of the Farmers' Institute for the coming two years.

3. *Resolved,* That we herewith express our appreciation of the honor conferred upon us by the presence of the Chief Executive of the State, Governor John K. Tener, and the Senior United States Senator, Hon. Boies Penrose, and the pleasure of their excellent and instructive addresses. Further, That we commend the action of the Governor and the legislative bodies for their generous support of agriculture of the State. Further, That we endorse the attitude of the Governor towards the creation of a State Fair, believing that such action will more rapidly advance agriculture.

4. *Resolved,* That we recommend as speedy a construction of Post Roads, permanent highways and earth roads throughout the Commonwealth, by means of Federal and State aid, as is consistent with good finance and good government.

5. *Resolved,* That in view of the present local and national agitation for the inauguration of co-operation among the farmers, that we endorse the establishment of a bureau to assist this movement in the National Department of Agriculture, and that we urge our own State Department to obtain, through its own initiative and through the assistance of other available agencies, such information as may be of assistance to the farmers of the State, in enabling them through their local organizations to form business relations with consumers' associations so as to sell directly to these organizations, and with the manufacturers of farm equipments, so that the local organizations may buy directly from the manufacturers and eliminate all unnecessary intermediate buying and selling agencies.

6. *Resolved,* That we endorse the movement for the enactment of a law by the National Congress, permitting the loaning of the postal savings deposits, now deposited with the national banks at two per cent. to farmers up to seventy per cent. of the selling value of real estate and sixty per cent. of the selling value of crops and livestock; with a long time mortgage as security for the real estate and with such security as may be deemed necessary for the absolute safety for loans on crops and livestock at the rate of three or three and one-half per cent. interest.

Since it has pleased the Ruler of all things to remove from our midst, by death, two of our most estimable and valued County Chairmen, Mr. A. D. Holman, and Samuel McCreary, be it

7. *Resolved,* That the State Board of Agriculture, the County Chairmen and Farmers' Institute Lecturers have sustained an incalculable loss.

*Resolved,* Also, that a copy of this resolution be spread upon the minutes and a copy sent to the bereaved family.

Whereas, Real estate is paying more than its just proportion of taxes and it is proposed to still farther encumber the State with a loan of fifty million dollars for the construction of roads, while we favor good roads and their maintenance if the money necessary were judiciously applied, we are not in favor of the proposed loan until means are provided by which our revenue can be increased without inflicting still higher taxes upon the public.

And, whereas, After diligent inquiry it is found that nothwithstanding the condition of our highways during the passing century, the farmers have been successful in marketing all their products until this time and bring to the farm all the supplies required, so there remains a very small per cent. of any crop that is seeking a market at this time.

8. Therefore, be it Resolved: That we are unalterably opposed to encumber future generations with a debt that is unnecessary and uncalled for at this time.

Franklin Menges,
J. H. Schultz,
M. E. Conard.
Committee.

**MR. HUTCHISON:** I ask to have the report amended in two little items if the Chairman will agree, and that is, that the press, not only of this town, be thanked, but also the press of the State, which has been sending out the reports to different sections of the State; and that you include the Hon. E. E. Jones and Col. Foster in that list of gentlemen who came here to speak to you.

**PROF. MENGES:** I will be glad to accept those amendments.

(It was then moved and seconded that the resolutions be adopted as read)

(On motion, the resolutions were adopted as a whole)

**DIRECTOR MARTIN:** Mr. Chairman, there was an action this afternoon, calling for a committee to take under consideration the formation of a better plan for advertising Farmers' Institutes by the County Chairmen. We would appoint on this Committee, Mr. G. F. Barnes, of York; J. Aldus Herr, of Lancaster; H. G. McGowan, of Berks; S. S. Blyholder, of Armstrong, and Matthew Rodgers, of Juniata.

**The CHAIRMAN:** Is there anything further to come before the meeting?

**DIRECTOR MARTIN:** I don't know of anything, Mr. Chairman.

**The CHAIRMAN:** If there is nothing further, we will now introduce to you Mr. Wittman, who will give us a talk on poultry.

Mr. Wittman spoke as follows:

## SOME PENNSYLVANIA POULTRY HOUSES, GOOD AND BAD

By W. THEO. WITTMAN, *Allentown, Pa.*

Two months ago, when I first knew about this, it happened that I had a lot of work on hand and could not pay attention to it until a few weeks ago, and I haven't seen a single one of these slides on the screen, but I hope they will turn out all right and that you will like them. I had absolutely no material. When I had the fire at Mount Gretna I lost all the pictures and even my camera and whatever pictures I have had since were used in articles sold to various papers, so I had to start from the very beginning and these are all new pictures and I haven't seen any of them on the screen.

We will have the first one now. One way of getting these pictures was by getting a team and getting right out in the country and getting farm poultry. That was the very first chicken house we found. That is within a mile of Allentown. That is a very fine farm. Right across the street from this old chicken house there is a magnificent barn with a herd of wonderful Holstein cattle and that's what that farmer thought of his chickens—an old hole. That is the next farm. That fellow had his chickens sleeping above the pig pen, a mighty poor place to have chickens. The conditions were very bad on that particular Lehigh County farm. We are going to hurry through these pictures. There's three men on to-night and we are going through very quickly. The next farm has a fresh air poultry house. The chicken business looked good to this farmer and I believe that house was open like that all winter. He had a curtain here, but he told me he had not been using it, and he had some splendid chickens, as you will see in the next picture. (The operator couldn't find the slide for the next picture). That's a Lehigh county farm. That fellow has a splendid place for chickens and has a beautiful sunny slope. The only objection would be that he has the chicken house between his own home and the public road. I would not think that was a good place. I would want my home the most prominent thing on the farm, but he had a splendid place for chickens, and while he had a lot of grass in his chicken house, he knew enough to take out that much, at least, in April, and things looked very good on that farm and that is quite a nice chicken house. That was a two-story chicken house on a Lehigh county farm. I took these all in one day. He had an entrance at the back and one over here. The upper story was not much of a success, he told me.

This is a barnyard. When we arrived at this farm, the barnyard was just full of chickens. Right over here is a pig pen. The pig pen was full of chickens and my own opinion is, that is a mighty poor place to have chickens, in the pig pen and on the manure pile. We chased them all off. One rooster didn't like it and he got up on the fence and crowed and crowed and tried to tell us fellows that we didn't know much about chickens, anyhow. He liked the old-fashioned way of staying on the manure pile. There's the picture I wanted to show you of that farm that had a fresh air chicken house. He had a splendid white Wyandotte and his house was well sheltered. made of cement, mostly. He built it himself and it cost him $64.

A Member: What size was it

MR. WITTMAN: He had a workshop on one side, 38 feet. frontage; he had some old material around the farm and did most of the work himself. This is one of his white Wyandotte roosters in the foreground. That farmer didn't have good looking chickens, they were all sick; if you can see what this means you understand why they were sickly. They were in a mud-hole; he put his chicken house in a hole. There was a splendid steel roof on this, but he had a very, very poor location. His chickens are always bound to be in poor health when confined in a mud-hole. There were lots of ponds of water standing around, not a bit of glass or anything likely to make poultry keeping a success. These are of Lehigh county farms, the pictures taken in April by myself and another gentleman. This is the interior of that two-story chicken house. We found it difficult to get interiors. We came to one farm where the chickens looked poor and we tried to get the interior. This farmer feeds his chickens on cobs. He had been doing that for a number of years. There was about a foot of corn cobs in that chicken house, mixed up with manure and dead chickens. The smell and filth was something fierce and I should like to have shown it on the screen to-night. This was a new building. These conditions were quite fair. I shouldn't like that slanting roof he had, but that was quite a sanitary and good chicken house.

That is a Lehigh county chicken house. That is 2 by 12 ft. in front and 9 in the back, giving us an average height of 10 ft. There was too much glass in it. This describes what I was trying to get at. This is the chicken a foot high, with a 10 ft. ceiling; it goes away up there. The area is equal to a 6 ft. man in a house with a 60 ft. ceiling. We men could not live in houses with 60 ft. ceilings. A 6 ft. man builds a house with a 9 ft. ceiling. That is the sort of house a man builds for himself, but he builds a house like this for a chicken. This is almost the limit, a foot chicken in a 3-ft. house. That had plenty of material in it for two or three good chicken houses. It is entirely too high. That was the only chicken farm we found that day. There were 1,200 chickens in that meadow, quite large ones already, but they don't show on there. It was getting late at night. It has not been very easy to go out into the country and pick out a whole lot of places. In the afternoon we could be where we should have been in the morning and vice versa. Some chicken houses we had no chance at any time of day to get a good picture. There was one farmer we met—we spied around looking for chicken houses and there wasn't any in sight; then it struck me there were no chickens either, and the farmer was watching on a bench and I called to him, "Don't you keep any chickens?" He said, "No." I asked him why. He replied, "I don't like them." "Why?" He said, "I don't know; there ain't any money in the chicken business, anyhow. The other fellow may keep chickens." I wish everybody that felt like him would quit keeping chickens. I said, "Brother, here's my hand, I wish there was a whole lot of farmers like yourself, who, when they don't like chickens, would quit keeping them and give the people that love chickens so much more of a chance.

The test of a poultry house is, Do the chickens live in it? There are very few pictures that I have—this is one of them. This is a fresh air chicken house in which you don't have to pen the chickens. There is no way of penning those chickens in there; they will stay in because it's got plenty of sunlight and fresh air and litter and scratching material and is a splendid home for chickens. If the house is right the chickens will live in it. That is a view of a chicken house of the same sort. That is the interior of that same chicken house. That is the same chicken house built in a long continuous row, by Dr. Robert Mead Smith. This is that same chicken house built in a long continuous row, and while the Doctor is a new man at the chicken business, he is one of the most successful poultry men in Pennsylvania to-day. That is some more of the same thing. This is an interior that happened to be good. We had great difficulty in getting interiors. We put down this curtain and got the interior of the Doctor's chicken house. He has a long carrier to carry the feed. This is the curtain. This is the sunshine againt it. This is home. It is one of my own home chicken yards and this picture was taken because there are eight white Leghorns out of 15 that made a record of over 200 eggs in one year. Every hen you see there laid over 200 eggs. You see lots of green grass and that is the only way to keep chickens, on green grass. Joseph Tolman ,of Rockland, Mass., invented the first fresh air chicken house. All honor to Tolman. There is a plan view.

I had some other plan views of chicken houses, but I shall not use them to-night. There is Dr. Woods, another Massachusetts man, at Spring Lake. You understand, down in New England it is pretty cold, yet they are strong on fresh air. This is wide open the year around. This is Dr. Woods' house in Texas. I found a few in Texas last year when I was down there. That is the Wittman fresh air house; you saw that a minute ago. There's one thing I like about this house, the sunshine in here. There's a streak of sunshine comes clean back to this corner. I don't know whether you can see it from there or not. We like that about that Wittman house, which the other fresh air houses do not have, every inch of floor covered with sunshine on the 21st of December. That's another fresh air house, the Gollet. I had a beautiful slide and dropped it and broke it and had nothing but this. Here is a chicken house that is nothing but a roof. This is the White Plymouth Rock Farm. It is a pleasure to go on that chicken farm and that is the sort of house they believe in down in New England—cold climate.

Now we are showing you a big Pennsylvania poultry farm at Newtown, Pa., a very successful poultry farm, one that has been in existence quite a number of years. It is a very large plant, just full of chickens. There is a laying house and here is another. Unfortunately, we tried to get too much on that picture. That is one of the laying houses, inside detail, a little closer by. This is a large commercial proposition. That is the interior of that same laying house. We got those White Leghorns when they were busy scratching. They never knew we were taking their picture. That is the incubator cellar in that same place, taken before the 2,400 8-capacity giant incubator went in it. There's one of their brooder houses over in New England. These are large Pennsylvania poultry farms. That's the interior of the brooder house where they start the little White Leghorns.

I am proud to say that's a picture of Montgomery county, the plant of A. J. Fels, a young man who ten or twelve years ago was just as poor as poor could be, didn't have anything, and to-day his name is known the world around. To-day there is practically only one man living that has as good White Wyandottes as A. J. Fels. When we got there he was away. There was a little boy there who happened to get in all the pictures. He was a very smart little boy. He told one thing that his papa wouldn't like to have told. We got around to one pen and he said, "That's Teddy, he's never been out; been in Madison Square Garden." "Does your papa sell eggs from that pen?" "No, but some men the other day offered him three dollars an egg of that pen and he sold some eggs." There's some of the colony houses on Fels' plant. You only need to pass the place to know it's a profitable plant. You see our little boy took to us and get in every picture. There's the farm, paid for by chickens. I understand Mr. Fels paid for all that farm out of chicken money. It is quite a good farm, quite a good looking place, as you can see by the picture.

Now, of course, in taking these pictures you come across a lot of good things. Here was a mighty good thing sent to me as a sample, a parcel post egg carrier and I put it in front of the camera and I think I got a very good negative. I think it is a good thing. That was a lucky snapshot; all different breeds have their own special types. The Polish have their own type and you see the Polish type there beautifully and superbly shown in that picture and you get that beautiful coloring with a green sheen to it. You see the green over here and how beautiful both the male and female come out, and I should give any amount of money, almost, if I could have a hundred different varieties of chickens as good as that. I would have something wonderful and superbly beautiful to me as a chicken man, because this comes out so green. That was very hard to get. Chickens don't like flashlights and the first wasn't good and they went up like a shot and we went in there three different nights, but they were on the alert. You can see the expression of this chicken, he was just about ready to go up in the air, but we got them before they got up. I want to say, "Good night and thank you for your attention."

The CHAIRMAN: Has anyone any questions to ask the gentleman? If there are no questions, we will next have a talk by Prof. Watts, Dean of the Experiment Station, State College, Pa., on "The Most Intensive Type of Agriculture."

Prof. Watts addressed the Institute as follows:

## THE MOST INTENSIVE TYPE OF AGRICULTURE

By PROF. R. L. WATTS, *State College, Pa.*

Profits in farming depend very largely upon the type of farming followed. In these days there is a great deal of discussion about intensive agriculture and many people believe that the greatest need of American agriculture is to practice more intensive methods. As a general proposition this may be true, although it is equally true that hundreds and thousands of producers would increase profits by following more extensive methods. This is especially true in the animal husbandry industry, which requires a larger acreage, in order to provide the necessary amount of feed for the stock. I am confident that our hill lands should be devoted more largely to grazing and that the rough, stony, broken areas could be utilized to good advantage in providing pasture for various kinds of stock.

Intensive agriculture, however, will become more and more important in this country as the population increases, and we will be required to produce more on an acre of land in order to provide adequate support for our increased population, within recent years, vegetable forcing has attracted special attention and Pennsylvania has seen a material gain in the amount of glass devoted to growing vegetables. It seems to me that this highly specialized industry affords special opportunities throughout the State of Pennsylvania because of our many unexcelled markets. This type of farming appeals to business men because production is much more certain than in the open ground where some conditions are uncontrollable at certain times. The greenhouse man, however, need have no fear about any of the discouraging conditions which affect crop-producers out-of-doors. For example, a heating plant is installed by means of which he protects his vegetables from frost and provides a suitable temperature even when the thermometer registers lowest on the outside. As the house is nearly all glass, practically the full amount of light is admitted. Again, the up-to-date greenhouse plant is provided with an abundant supply of water and with the over-head system of irrigation the vegetable forcer is not the least concerned about drought.

With this modern system of watering, it is possible to water large areas under glass at very slight expense. When insects become troublesome, he can use the sprayer or fumigate the house. Only a limited amount of soil is used and when this becomes infested with insects or disease germs it is sterilized by means of steam or formalin and in this way the soil is freed of pests that often destroy crops out doors. Hailstorms or hard winds damage the houses sometimes, but these losses may be covered by insurance. At the present time greenhouse men are securing larger profits perhaps than any other class of producers and as many of our Pennsylvania markets are not well supplied with forced vegetables it is well for our land owners to give this industry more attention.

The following factors should be considered in connection with the vegetable forcing industry:

(1) It is exceedingly important for the operator of a greenhouse to be in love with the industry. This is absolutely essential to success. He must be willing to work long hours at times and to make a thorough study of every detail. He must also be observing in order to determine and maintain the proper temperatures and atmospheric conditions for the crops at the various stages of growth.

(2) The location should be selected with great care. Ordinarily the houses should be located near the market to be supplied.

It is generally conceded that from an economic standpoint it is better to build the greenhouse in the suburbs of a town or city than to build at a remote distance and haul the produce to market. As the greenhouse will cover a relatively small amount of ground, it is not necessary to locate it in a remote distance from the market because of the high cost of land in a more convenient location. While greenhouse crops may be grown successfully in properly prepared soils of almost any type, it is universally conceded that sandy loams are the best for this purpose. These soils are easily worked, well drained and provide the very best conditions for the root development of all the crops which are usually grown under glass. A liberal supply of water must be taken into account as an enormous amount is required to produce greenhouse crops which are grown so close together. If the over-head system of irrigation is to be installed, it is also important for the water to be delivered with a pressure of at least 15 or 20 pounds to the square inch. The contour of the land should also be taken into account. Comparatively level land is always preferable and it is an advantage for the land to slope to the south or southeast. Protection from hard winds is desirable. This may be secured by means of wind brakes or perhaps the house can be located on the south or southeast side of groves or woodlots which will give the necessary protection. It is also worth while to take into account the character of the road leading to the market. Greenhouse products are very perishable and they should be delivered as soon as possible to the point of consumption.

(3) In the construction of greenhouses the following factors should be considered:

(a) Use first-class material.

(b) Employ at least some iron in the construction. Iron pipes and angle iron are largely used for posts, braces, gutters, etc.

(c) Place all heating pipes around the sides of the house and do not have any interior benches or concrete sides to solid beds. The large modern greenhouses for vegetable forcing are free from any fixtures in the interior of the house which will interfere with tillage and other operations.

(d) Build wide houses—not less than 25 feet and 30 to 40 is better. If to be used for tomatoes and cucumbers, provide a height at the eaves of not less than 6 1-2 feet.

(e) Provide a large door at one end of the house so that it will be possible to enter with a horse and cart or implements. Many large establishments are making use of regular farm implements in preparing the land for these special crops.

(f). Provide ample ventilation at the ridge. Many growers also consider it necessary and important to have ventilation along the sides of the house.

(g). Provide ample radiation and use hot water for heating, if possible. Some of the largest greenhouse plants containing five acres or more are heated by hot water rather than steam.

(4). Endeavor to employ labor that can be retained. A year or two of service under glass is necessary to train a man for the best work. The greenhouse growers can usually well afford to advance the wages of their employees sufficiently to retain them.

(5). Whatever the type of soil, it is necessary to incorporate a large amount of organic matter. This is usually supplied by the use of rotten manure. In the largest establishments it is customary to spread the manure broadcast over the ground in the house before plowing or spading. This is the most economical in every respect and should be more generally practiced. Some of the intensive and successful growers apply about forty tons of manure to the acre annually. This amount of manure, applied for several years, will put almost any kind of soil in the very best physical condition for crop production. It will add the necessary fiber and at the same time supply all, or nearly all, of the food needed by the various crops to be grown. Near the cities, horse manure is universally employed, although other kinds of manure serve the purpose very well.

(6). In order to control disease and insects, soil sterilization is almost universally practiced by extensive growers who have been in the business for several years. Of the two methods previously mentioned, steam is considered more valuable. It is merely a cooking process for the temperature of the soil is raised to over 200 degrees F. in order to destroy the various destructive pests. The steam may be admitted to the soil by the use of perforated pipes and this method is favored by many of our most successful growers. Another plan, used largely at Cleveland, Ohio, is to invert iron pans, which are usually about 10 feet square and 8 inches deep, over the beds to be sterilized and the steam is admitted through a pipe at one side or in the middle of the pan. The steam percolates to a depth of eight inches or more in the soil and if kept in one place for about an hour all injurious forms of life will be destroyed.

(7). In the management of greenhouses it is important to maintain uniform temperatures. Ordinarily a temperature of 10 degrees lower is maintained at night than during the day time.

(8) Fresh air is absolutely essential to success. Some air should be admitted every day, and during the warm months of the forcing season ventilators and doors should be thrown wide open in order to admit the greatest amount of fresh air. The forcing industry is almost an all the year round operation, for the first crop is usually ready in September and the last crop is not harvested until July. Too much fresh air can not be admitted early in the fall and in the early spring and summer. Full ventilation during the warm months is also exceedingly important from the standpoint of comfort to the workmen.

(9). Watering pots and even hose are no longer used extensively in the management of great commercial ranges. A very large percentage of our growers have installed the overhead system of irrigation which has been found to be highly satisfactory for all of the vegetables grown under glass. It is especially important to supply water very liberally during the late spring and early summer when the crops are maturing and require a large amount of soil moisture.

(10). In the forcing of tomatoes and cucumbers, practically all growers have found mulching a very satisfactory practice. The mulch is usually applied after the fruit is fairly well set and it is customary to apply about a three-inch mulch of fresh horse manure which has been aerated for a few days before using. This mulch serves several purposes, as

(a). It conserves the moisture of the ground better than any kind or amount of tillage.

(b). When applied in sufficient amounts, it prevents all weed growth.

(c). Every time water is applied, liquid manure is taken down to the roots of the plants, thus providing additional nourishment at a time when the plants are most in need of it.

(11). Two of the most destructive insect pests are the green aphis and the white fly. The former may be controlled by fumigating with tobacco and later with hydrocyanic acid gas. Before attempting to use hydrocyanic acid gas, the inexperienced grower should write to his Experiment Station for explicit directions.

(12). As greenhouse products are usually sold at fancy prices, too much care can not be exercised in preparing them for market, They should be clean and fresh in appearance and they should be packed tastefully in attractive packages. Many of our most successful growers find that it pays to use small packages holding only a few pounds. The package should be properly labeled with the name of the grower.

Quite an assortment of vegetables are grown under glass, but lettuce, cucumbers and tomatoes are very much the most important. These crops are relied upon by all growers, and other crops, such as beets, rhubarb, parsley, onions, radishes and cauliflower are grown to a limited extent. Of these miscellaneous vegetables, radishes, cauliflower and rhubarb are the most important.

## LETTUCE

Taking the country as a whole, lettuce is regarded as the most important crop grown by vegetable forcers. It is of more easy cultivation than tomatoes and cucumbers and with proper management returns satisfactory profits. Throughout the East, head varieties such as Boston Market and Tennis Ball are grown almost exclusively. When frames are used, Big Boston is the variety relied upon. It is a well-known fact that head varieties can not be grown in soils that are not properly aerated. That is, the soil must contain a sufficient amount of sand and vegetable fiber to admit air readily and to provide the proper physical conditions. The soil should take water freely when applied and it should dry quickly on top. These conditions are absolutely essential to success in growing head lettuce and it is folly for a gardener to attempt to grow this type of lettuce in heavy clay soils.

In most sections of the West, where the soil is heavy in character, the loose heading varieties are used. Grand Rapids is practically the only variety of this type planted in the Western States and in the western part of Pennsylvania and Ohio. This is a beautiful variety possessing curly leaves that are valued highly for salad and garnishing. The largest areas under glass in the United States are devoted to growing of Grand Rapids lettuce, although there are about Boston some very large ranges that are used in growing head lettuce. When a greenhouse is devoted exclusively to the culture of lettuce, with good management it is possible to remove during the forcing season four or five crops. In order to gain at least one crop during the season some growers transplant their seedlings into pots rather than flats and the potted plants are plunged between the rows of larger plants which are set in permanent beds. They may be held in this condition for at least three weeks and this means not only a gain in time, but a saving in space. When transplanting into flats, it is customary to allow an inch and a half between plants and many successful growers prefer to space two inches apart.

Lettuce requires a much lower temperature than tomatoes or cucumbers; night temperature ranges from 45 degrees to 50 degrees and the houses are held at a temperature of about 10 degrees higher

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during the day. With sunshine the temperature may rise to 75 degrees or 80 degrees without harm to the crop. A somewhat higher temperature is desirable early in the stages of growth and low temperature at the time of maturity is favorable to increased weight. Lettuce requires very liberal feeding and it is difficult to apply more partially decayed manure than the plants can use to advantage. The manure should be thoroughly incorporated with the soil before sterilizing. When the plants fail to make a satisfactory stand after setting in the permanent beds, it will pay you to apply nitrate of soda in either dry or liquid form. When used as a spray, good results may be obtained by dissolving nitrate of soda in the proportion of one ounce to one gallon of water. In order to make certain that there will be no danger of burning the foliage, fresh water may be used as a spray immediately after the nitrate has been applied. When it is known that there is a shortage of available plant food in the soil, it is desirable to use some nitrate when preparing the ground, although a slight sprinkling will serve the purpose. Lettuce is marketed in a variety of packages. At Toledo, where the crop is grown very extensively, barrels are in common use. In the Cleveland and Ashtabula districts, the half bushel chip basket is preferred.

## CUCUMBERS

The cucumber ranges second in importance of the vegetables which are used for forcing purposes. The crop is grown to some extent for sale during the fall and winter months, but the bulk of the greenhouse cucumbers are placed on the market during the spring and early summer. It is customary to make the last picking of cucumbers before the middle of July. Many growers use lettuce until March or April and then plant cucumbers or tomatoes. This in most instances is a more profitable combination, than to grow lettuce throughout the year. The American type of cucumber is used almost exclusively in the United States. While the English varieties are grown to a limited extent in houses on private places, they have not proven popular nor profitable in many commercial houses. In the Irondequoit district of New York, which supplies the Rochester market, a cross between an English variety known as "English Telegraph" and a strain of an American variety, "White Spine," is grown almost exclusively and finds ready sale in that market. The new variety, known as "Abundance," is unusually prolific and while the flesh is radically different in texture and flavor from the American type, it finds favor and is preferred by the consumers of Rochester. Of the American type the Rawson Hot House is the most popular. Many of the most successful and extensive growers, however, are developing special strains of White Spine to satisfy the demands of their home markets.

In order to avoid, if possible, failure from planting poor seed and in getting a type of cucumber which might not satisfy the demand, many of the best growers produce their own seed. In some instances small houses are devoted exclusively to this purpose. A separate colony of bees may be maintained in the breeding house in order that there may be no introduction of pollen from outside plants. The cucumber thrives on heavy soils, although it prefers a soil containing considerable sand. Some growers start their plants in pots but the more careful producers prefer to sow the seed in beds and then pick out the seedlings when they are very young. In fact, the tiny plants may be shifted to pots of about four inches in size about as soon as they can be handled. This is a very important matter, because when the plants are two weeks old or more, they do not stand the shock of transplanting nearly so well. There is considerable variation in the system of training. An A-shaped trellis is popular in many sections. When this system is used, plants are set about a foot apart along the lower edge of the trellis and permitted to run over the wires or slats. They are then pinched off beyond the first joint and the plants tied to the trellis. Some growers prefer to train the plants upright, tying to wires or stakes. Others grow a single stem upright until it reaches a horizontal trellis arrangement overhead and the stem is permitted to branch, forming an umbrella-shaped plant.

This system is used by many growers at Rochester where Abundance is the main variety. In order to get a full setting of fruit, the flowers must be thoroughly pollenated. This is most economically accomplished by the use of bees. Some growers prefer to keep the bees in the house, while others think it is better to have them outside. One of the most satisfactory plans is to locate the colony at one end of the house on the outside and remove a pane of glass from the house for the entrance of the bees and another pane in the roof and at one end of the greenhouse. This will make it possible for the bees to work in the inside of the house or on the outside and they will thrive much better with this arrangement than when confined in the greenhouse. The pane of glass which is removed from the corner of the roof of the house will allow the bees to pass out when they congregate, as they naturally do, in the corner of the house. As previously indicated, fresh manure is generally applied as a mulch.

Cucumbers are marketed in a variety of packages. The barrel is used at Toledo, but half-bushel chip baskets are quite generally employed throughout the country, except around Boston, where the bushel box is preferred.

## TOMATOES

The tomato offers special inducements for cultivation under glass in Pennsylvania. We have scores of towns and cities which seldom see greenhouse-grown tomatoes. This vegetable is very popular on our Pennsylvania markets and it should be grown much more largely under glass. Both the pink and red varieties are produced for the Pennsylvania markets. There is an impression in some sections that the pink variety is superior in quality, but this is an erroneous idea. The red varieties are preferred by some markets because their decorative value is somewhat greater than the pink variety. Pink varieties are not wanted on the Philadelphia markets, but they find ready sale in Pittsburg. One of our best producing varieties, namely, the Globe, is pink or purplish in color. In the greenhouse at the Pennsylvania State College no variety has produced quite as many pounds to the square foot as the Globe. It is also very symmetrical in shape, which is important when a variety is to be used for forcing. Of the red varieties, grown in the College greenhouses, Bonny Best has given the best results. This is a highly desirable variety for forcing because it matures in less time than most of the garden varieties and sets a very heavy crop of bright, smooth, well-shaped tomatoes. Comet, an English variety, is used largely about Philadelphia and is considered especially desirable for mid-winter forcing. Another English variety, known as Peerless, which has been materially improved by growers at Rochester, is also very desirable in that section, at least. It is prolific and the fruits are brighter in color than Bonny Best.

Tomatoes are grown throughout the forcing season, although the bulk of the crop is placed on the market in the spring and early summer. The plants are usually started in flats or beds and transplanted to pots which may be 3½ or 4 inches in size. The plants for the fall crop are generally set in the permanent beds during the month of August, and for the spring crop they are bedded any time after the first of February. Single stem training is practically the only method used. All auxiliary shoots or branches are pinched off as fast as they appear and the plants are tied to stakes, strings or wire trellises. In some instances the plants are twined about upright strings which is more quickly done than by tying and the support is just as good if properly managed. When the plants attain a height of 5 to 7 feet the tops are removed and no further growth is permitted, except of the foliage. As with cucumbers, a mulch of manure is applied about the time the uppermost cluster of fruit is set. Mulching should not be delayed longer than this because ordinarily it would result in fruit of smaller size. Greenhouse tomatoes should be permitted to ripen fully on the plants before picking. They should be packed in clean, attractive packages, holding not more than five pounds of fruit.

The CHAIRMAN: The last on our program this evening is a talk on fruits, by Prof. H. A. Surface, Economic Zoologist, Department of Agriculture, Harrisburg.

Prof. Surface spoke as follows:

## IMPROVING THE QUALITY OF OUR FRUITS

By PROF. H. A. SURFACE, *Harrisburg, Pa.*

Ladies and Gentlemen: The subject to which I wish to call your attention this evening for a short time is, the Cheaper Production of Better Fruit, and I wish to lay emphasis upon a feature of the subject that is not generally discussed, the cheaper production. We have spoken of fruit production in a practical manner up and down the State of Pennsylvania, until in every township in this State you have had an opportunity, during the past eight years, in our demonstration orchards, to see the better fruits produced. Here in this county, there are persons now in this room who this evening told me that had we taken their orchards for demonstration or supervision purposes a year sooner, it would have been worth at least a thousand dollars more to them. Yesterday there was a man in attendance here who, for the past four successive years, has produced full crops of apples in the same orchard under our demonstration work. Yesterday morning I received from W. H. Banzar, the President of the Lycoming County Fruit Growers' Association, a letter saying that he has now for the third successive year a heavy crop on the same orchard. That is the work we are demonstrating and that is what Governor Tener spoke about this afternoon when he asked you if you knew about our demonstration work. We have not been able, in these demonstration and supervision orchards, to demonstrate a cheaper method of production, because that lies mostly with the individual, but that is something I have worked out in my own orchard and you can now say whether it be discreditable or creditable; nevertheless, the fact is that I am now the largest owner and operator of orchard land in Pennsylvania and have certainly been obliged to work out practically a method of cheaper production.

I wish to call your attention to the various fundamental points that the fruit grower must observe in order to reduce the cost of production. He must have a regular prospect of a crop, not a crop once in four or five years, not a crop one year and an off crop the next year, but a regular prospect of a crop. To do that he must, first of all, have an available site. Now, my friends, I can take you today to people in this State and can name them,—I will commence now, because I am a great fellow to tell facts and names, too—and let anybody follow the thing up and be convinced that what I say is absolutely right. H. C. Snavely, a member of the House of Representatives, of Lebanon county, told me three days ago that in his orchard, in the upper elevated part, where the air is pure, he will have a full crop of peaches, while in the lower part it has been frozen up and lost. I can show you that spotted condition all over Pennsylvania. What does it mean? If you expect to become a successful fruit grower and reduce the cost of production, you want to select a favorable site. In my own orchard, because it is elevated, I have, at the present time, as heavy a setting of peaches as I ever saw upon trees, so many that I shall be obliged to pull off three-fourths of the amount now on the trees, unless they come off by the June drop, but it is because I have a favorable site.

The second point is a favorable soil. We need a loose soil for the successful growing of the stone fruits. A clay soil, a lime soil, is all right for apples and pears and quinces or fruits of that class, but for the stone fruits we must have a loose soil. I care not how favorable your site and other conditions are, if you haven't a soil that is properly adapted to fruit growing, there is no need of going into it, and lots and lots of people up and down this State write to met and ask me, "Must I blast with dynamite for planting an orchard?" And I say, if your soil and sub-soil conditions are such that it is necessary to blast, you haven't proper conditions for an orchard. That answers the question and who would like to go into poultry raising or the greenhouse industry or anything else, with unfavorable conditions for success? And in the same way we must rationally go into orcharding.

The third point is, as granted, a good site, proper soil and good road—we scarcely realize the essentials of a good road right at the orchard, for hauling the fruit away in an unbruised condition. I can tell you that there is more fruit damaged after it is picked than there is before, by being bruised in the process and packing and transportation. It should not be. It almost makes me sick to see a well-grown crop damaged by rough handling.

The next point is proximity to the station or market. A man would certainly be doing himself a great injustice to expect to grow an orchard twelve, fifteen or twenty miles from the shipping station or market. I know a gentleman in this State, who has a large orchard that requires seventeen teams all the time to haul his fruit to market during the picking season. I know a man in this State, who, on the last week of August year before last, paid $750 that week to have his peaches hauled to the market—he was that far from the market, the cost was that great, and Mr. George Barnes knows him, too,—Mr. Cochel over there in your county.

Now, the important point is to be near enough to your shipping station or market so that you will not lose time during the very important period of gathering your crop and that you don't have to haul your crop a long distance, with the expenses of hiring or keeping teams and the danger of damaging and bruising your crop in such transportation. The next point is the selection of good varieties. Now watch closely, my friends. I am pointing out those features fundamental to success in economic fruit production, that any one of them will cause a failure if it be absent—any one of them be missing from the plans of the horticulturist will put him at a decided disadvantage in competition with the other man when the competition becomes keen.

The selection of good varieties. A gentleman told me recently that he could sell Ben Davis or York Imperial. I said, "Yes, but wait till we have a bumper crop, a heavy yield, and I can take my Golden Stamen, Winesap, Roman Beauty, Winner, Bandana, and you can go through the streets and sell your Ben Davis and Yorks and I will follow right after you and hand the prospective customer my apples and he will say, 'Yes, I just bought some, I don't need any,' and I will say, 'Sample this apple and the one you bought and then see what you want hereafter.' " Have a good variety and have something to talk from and when you sell that variety, let the customer know what it is. I have orders for varieties booked now, here in my pocket; for example, I met a teacher in Camp Hill, Prof. Rice, who said, "As soon as your Crosby peaches are ready I want you to be sure to remember me with eight baskets." When I sell the Crosbys I tell them what they are. I have now several orders for the Champion peaches. I have an order from one man, who said, "As soon as your Old Vixens are ready bring me a basket every other day, with ten baskets for preserving." But I made this rule in planting, to plant those varieties which I know are good and which I like and believe the other people will like them. We cannot expect a permanently successful horticulture in this State based upon the planting of inferior varieties.

The next point is good, young trees kept vigorous from the time they are grown in the nursery. It does not pay to buy culled trees at a low price, because they are cheap. If you buy good trees it does not pay to let them lie around until the roots are dry or the bark commences to shrivel or the buds have started or they are damaged otherwise before you plant them. Keep them in good, vigorous condition until they are properly planted. Now I said good, young trees. One-year-old trees are to be preferred under all circumstances to older trees. I am sometimes asked, (I am getting along well in life), why I didn't plant four or five-year-old trees and save time by it. I can take a one-year-old tree and I can make it bear fruit sooner than—I can't say what you will do, I won't say sooner than you can make, but sooner than I can make two or three or four or five-year-old tree bear fruit, and what is more, I can make a much better tree of it than of an older one. This young tree should be properly pruned both before and after planting. I prune the roots to a length of 6 inches and prune the top to a height of 18 to 22 inches. If a tree is not pruned back at the time of planting, it will not start well and we want it to start well. These are essentials to success in the cheaper production of fruit. It should be properly planted. A tree poorly planted will stand still and grow but little the first year. It should be properly planted as to the distance apart of planting. Trees planted too closely together will be a source of discouragement to the grower as they become older. Apple trees, for example, planted 15 feet apart or even 30 feet apart, for permanent trees on good, rich soil, will be unsatisfactory. I started out by planting them 32 feet apart, with fillers 16 feet apart, or half way between, and I changed to 38 feet apart and now to 40, and all my permanent trees are 40 feet apart and I would recommend no persons to plant less than 40 feet apart. I have a good many letters coming to me from persons who say their trees are 25 feet apart. What are they going to do? They can send them up higher, but that will not relieve the difficulty. Modern horticulture demands low-headed spreading trees, that is the most fundamental point I have to give you, low-headed spreading trees and you cannot get it with trees that are close together. Avoid the mistake at the time of planting and get them far enough apart.

A Member: When the mistake has been made, what is your recommendation?

PROF. SURFACE: I would cut them out by a system of thinning, but I would have to see the orchard to say just what the recommendation would be. Plant in long, straight rows so you will have no more loss of time in turning than is absolutely essential. The same principal enters into the cultivation of corn and other crops. You cultivate short rows and you will lose time in turning and wear and tear on your implements and teams. It is harder on a team to be turning around and around than to be going straight ahead. I throw out the fences and plant clear across from one-half to three-quarters of a mile, and that is practical orchard production to reduce the cost of production.

Proper planting in regard to fillers. Now if you are planting your permanent trees 40 feet apart, you can put fillers in between them 20 feet apart that can be carried 8 or 10 years. They may be young bearing varieties of apples, like the Duchess, the Waggoner, the Yellow Transparent and other I can name, or they may be peaches or they may be standard pears or they may be dwarf pears, as I shall show you, but you must practice proper planting in regard to fillers. Your fillers, or young bearing varieties, will commence to give you profit before permanent trees come into bearing. For example, my dwarf pears, the second year they were out, commenced to give me a yield and the third year a good yield. The standard varieties were 20 feet apart, the dwarf, 10.

Proper planting in regard to pollenizers. In Missouri, when they had the great orchard fever for planting and planted great areas of one kind, they found they didn't bear fruit because they needed other varieties for pollenization. The best plan is to plant four rows of one variety, then four rows of another and come back to four rows of that variety. Four rows will let me drive between two rows and gather the fruit into the middle. Four rows is the nicest system of planting your trees to get the fruit together with economy, ease and system. If I had only two kinds of trees to plant I would plant four rows of one kind and four of another. For economic production we should avoid the planting of too many varieties for commercial purposes. Four varieties of apples are generally about enough unless it is a local market that you are going to reach by the peddling process, and then the more you have the better to give a prolonged picking system from first to last.

Proper cultivation. And by saying "proper," I beg the question. We must explain what "proper" is. That is best shown in the illustrations, but cultivation is essential. Cultivation of a special kind on a hillside by bringing down the soil to a bank so that the tree will stand in a kind of a bank or terrace on the hillside.

Proper cultivation in regard to intercrops. If you wish to grow fruit with economy you will want to grow some kind of crops between your trees, a low crop, I mean to say a farm crop; that is called an intercrop. You can grow corn, potatoes, beans—vegetables—any kind of a cultivated crop between your trees with profit and the kind of cultivation that the crop receives is the kind the trees should have.

Proper cultivation in regard to cover crops. No orchard should ever go through the winter without a cover crop on the soil. Let the intercroping or farm crop be such that along in the fall you can grow crimson clover or vetch or rye and vetch. That makes an excellent combination and gives a cover crop there to cover the soil, to hold the drifting snow, to keep the roots warm, to hold the soluble soil fertility, to bring nitrogen from the atmosphere and put it into the soil and give you organic matter to turn down for next spring. I have 80 acres at the present time of that kind, as dense all over the orchard as you see it there, and it is as good, according to the reckoning of the experts, as 15 tons of barnyard manure to the acre. Now that is growing fertility with economy, when 8 quarts of crimson clover seed to the acre sowed at the last working of the orchard can give me by the next spring a value of 15 tons of barnyard manure to the acre.

A Member: What do the seed cost?

PROF. SURFACE: $4.25 just now. It cost me $6.00 or $6.50. Hairy Vetch is a great nitrogen gatherer. It is a legume crop. It belongs to the pea and bean family. Any plant that belongs to the pea and bean family is a nitrogen gatherer and a soil manure.

A Member: What are you going to do with that stuff? Plow it under

PROF. SURFACE: I am going to save it for seed in this case; it will ripen early. You see how long some of these heads are. It will be ripe in two weeks' time. As soon as the crop is cut off I will chop it up with the disk harrow and put it in cultivation. I won't attempt to put an intercrop in this orchard because it has got too old for an intercrop. I don't care to keep an intercrop in a peach orchard after it is four years old. Then, proper spraying with the right material at the right time, the material at the right tension, with the right kind of apparatus and sprayed in the right manner, which means thoroughly—all those are necessary. If any are omitted it will be an element of error that will result in failure. If you use the lime-sulphur solution for spraying, that is the best and most economical material for a poor man for winter spraying, winter spraying, but if you don't use it strong enough you will fail in your purpose of controlling a great many of the pests that would be controlled by that spray. Throughout our county, the farmers have failed in general, not all of them, with their lime-sulphur spray for the reason that they have diluted it too much; they have used the commercial material which comes in packages marked, "Dilute 1 to 10," and they have done so and it wouldn't dare stand dilution more than 1 to 7. They diluted it so far that it wouldn't kill the scale; so use the right material at the proper strength.

MR. SEEDS: Scale is getting scarcer all the time.

PROF. SURFACE: Yes sir, it is being controlled better than ever before. I have scale all through my orchard and we are not worrying one whit about it any more. If I thought scale would be a serious menace to horticulture I would stop putting my hard-earned savings in orcharding. I think I will be able to keep it under control by using the same methods I should use if there was no scale in the orchard. If there were no scale in my orchard I would give the same treatment as though there were, because the material I use for scale kills other kinds of insects and also plant diseases.

The proper thinning of fruit must be practiced. We are going to hear more in the future of thinning fruit and it must be done. The trees must be cut back at the right time.

Cutting back when there is no crop. Last year, as soon as I found that the thermometer had reached 35 degrees below zero in my orchard, I knew the fruit buds in the peach trees were killed and I gave orders to have the trees cut back half their height, or 4 feet. It resulted in a wonderful growth of new wood all set heavily with fruit buds. I had the orchard sowed with crimson clover and let it go to seed and took off the seed during the year when I had no fruit to worry about that clover taking the water from the ground. I had 100 bushels of crimson clover seed to sell and a good, strong setting of fruit buds that were so strong that the recent freezing did not kill them, and I hold that I lost nothing whatever by the fact that I didn't have a fruit crop last summer.

A Member: After you cut back your peach trees, do you thin the shoots out any?

PROF. SURFACE: The trees are made so wide by this cutting back that the growth is so scattering, they don't need to be thinned. If that growth were in a dense, narrow state, it should be thinned, but it is so spread over the tree that it has not been necessary to thin it.

Cut back summer pruning. You are going to hear much more of summer pruning in the future than in the past. Cut back to balance your tree and make it symmetrical. A one-sided tree is not profitable. A tree missing means the loss to the owner of the crop that tree would produce. One tree to the acre out of an orchard means the loss of enough fruit to pay for the working of that acre the whole year. The same principle comes in with a lopsided or half-sided tree—you lose half the crop. Cut back until the tree is so balanced that it will be a symmetrical, well rounded tree. Remove the dead, dying and fatally diseased trees promptly, because they are a loss, and get in new trees in their places. This is economy in production.

A Member: Aren't you losing a good many half crops while you are cutting that back?

PROF. SURFACE: No, not if I cut back judiciously. One need not cut back all the top at once and when you cut back any part it will stimulate growth all over the tree, but the stimulation will be nearest to the point where it was cut off. It does not pay to let an old, sickly tree remain when you can take it out and start a new tree. It does not pay to attempt to doctor the old trees that are in a hopeless condition, when you can start new trees and get a good crop within a short time.

Trees must be properly fed. I use, especially when the trees are young, if the growth is slow, nitrate of soda; a little pinch, a tablespoon, around a tree in the summer when it is slow in starting to push out its branches or leaves will bring it out more quickly than anything else I can use. It starts the growth of the tree and stimulates it like a stimulant would a tired man. Phosphoric acid and potash may be purchased profitably by the orchardist, but in economic fruit production you cannot afford to buy nitrogen, and I have not bought half a ton of nitrogen excepting what has been grown from nature's laboratory.

A Member: Aren't you afraid of getting too much nitrogen?

PROF .SURFACE: That can be controlled. If I cut this off for seed, it would be taking away a great deal of that nitrogen, or if I see my trees are growing too rankly, that is an indication of too much nitrogen and I would mow it for hay. You can use rye, which does not bring down so much nitrogen in the soil.

Proper and timely picking are elements in economic fruit production. Fruit should be so picked that it is not bruised. It should be picked at a time when it is at its best. Pears, for example, are left by the inexperienced until they are ripeneing on the trees. That is wrong. They should be taken off when the seeds are brown and put away in the dark to ripen. The art of picking at the right time is a very important art and cannot be well taught in a lecture. The best place to learn is in the orchard with some person who is picking.

Proper grading is essential if we wish to get the best results in selling our fruit, but the proper way to grade them is by thinning them on the trees.

Proper packages and proper methods of hauling. I have seen apples put into barrels like potatoes, thrown on the wagon like grain and hauled in that way and sold at a price that is inferior, of course, because of the method by which they were handled. A grower should replant a tree as soon as it dies. He can put it right back in the same place so as to get the place where it should stand. I know several successful growers in this State who practice that method. The question will come up as to replanting a tree where there is disease. Mr. Savely will take up a tree at this time of year or in the summer, that is diseased with yellows, and plant a tree right back there this fall, and I have seen in his orchard peach trees 24 years of age still bearing fruit.

Make your own tree material. You cannot afford to buy it unless you are unusually wealthy. You can make it cheaper and fresher and have it more efficient than the material you buy. Prompt and proper treatment of pests must be given. They don't always demand spraying, but they should have prompt and proper treatment. To let pests continue in the orchard until the trees show the injurious effect of pests means to lose profit and for profitable production of fruit a man should live with his trees and on the very first sign of the presence of pests should get rid of them. He should buy and use implements adapted to orcharding, not the ordinary farm implements, but spreading disk harrows, orchard disks, side-draft implements, implements like the Morgan Orchard Hoe and others made especially to reach in and around the trees. One must be careful to avoid bruising the trees, because if he does he is going to make places where disease germs will enter. Keep bees in the orchard as a means of reducing the cost of production, because it increases the amount of fruit. Keeping bees in the orchard is as important as the interpollenization of varieties. Preserve the friends of the orchard, which are the birds, beneficial insects and other creatures that will destroy injurious insects. That is the outline I will give you as an address and I will be able to run through the slides more rapidly by having given you that outline.

I will show you two vetch plants. These are the same age. They were sowed in October. This soil was not inoculated and this was. You seen the difference in growth by inoculation. This is just commencing to show buds and this is in ful bloom. That is a picture of a portion of my own orchard. I have about 100 acres in that plot. You will notice the length of the rows, planted straight for cultivation. I have peach trees planted solid in the orchard beyond this, peach trees as fillers between apples trees in a low part of the field where the cold air is liable to settle. I have plum trees and still below that, pear trees. The pear and peach can be planted on lower soil. On this far point we have also a young peach orchard, this rolling land we get air drainage where the peach trees are planted, I avoid planting sickly or inferior trees. This tree is diseased with crown gall. If you receive anything of that kind in the shipment of nursery trees throw it out. The tree will live and grow, but will never give you a profitable crop. The subject for this address is profit in horticulture in regard to the economy of production. Here is a Winesap apple tree only three years of age, bearing apples. Now, my friends, I said proper pruning, but understand, after a tree reaches the size and age of this, the more you prune that away when it is dormant, the more you stimulate growth and postpone its bearing. If you prune a young tree too much you will make it grow more, but it won't come into bearing so soon.

A Member: Won't you get as much in the long run? It hurts the growth of a tree to bear too soon.

PROF. SURFACE: If it is bearing no more than that, that's enough. That one I can be postive of the variety, and if I want to take guaranteed cuttings from that, I can do so, but the tree is growing fast enough without stimulating it to further growth by pruning when dormant. I said treat the trees properly when they are received from the nursery. Here we are healing them in by tramping the earth over the roots of the trees just as they have come from the nursery, even if it is to be only a few hours until they are put into the ground, I wouldn't have the wind and sunshine strike the roots of my trees if I could possibly avoid it. By the way, some persons say they want to see some of these professional men in their working clothes. They have a chance to see one there. He has his coat off once in a while when he is at home, I assure you. We receive our trees by the wagonload. Everything must be done in a speedy manner to get it done fairly well and to get the results. We bring the wagon up to this power saw and clip the trees by sawing. The trees come 10 to 25 in a bunch and are passed to the operator, who saws them up, throws them on the wagon and goes ahead. I can prune my trees about twenty-five times as fast by that method as I can by hand and I think that the results will show you in a few minutes that the trees are not injured by that method of pruning. That is the lower headed tree of which I spoke. Now, there is a tree less than three years of age at the time the picture was taken. Most persons would have pruned that up to a height of three feet and would have lost this crop that I get the first year. I have from 2 to 2½ baskets of peaches on that tree. The lower headed tree gives me not only early fruit, but it gives me less dropping of fruit in the manner called windfalls by most persons, that is, when they ripen, these branches reach the ground, with their load of fruit and resting on the ground are bruised, and the tree is not shaken by the wind kind and the fruit is not shaken from it.

I am asked, how do you cultivate under the trees? A low headed tree gives opportunity to thin by hand, to prune, to spray and to pick with economy; above all else, it lets the tips of the branches rest on the ground and the tips of the other branches above rest upon them and saves the tree. There is a Stamen Winesap tree that bore 18 barrels of apples, three bushel barrels. See the shape of the tree with its spreading branches coming clear to the ground and not a broken branch on the tree. That is a Yellow Grimes Golden three years old and bearing. It shows the result of the planting of fillers. The Grimes Golden is a young bearing variety of tree. The Winter Bandana does not bear so young. Every other tree through this row of apple trees growing in this way is a young bearing variety. The next row of trees, 20 feet from that, is a solid row of peach, then a solid row of apple, alternating with a solid row of peach. The long rows give us an opportunity for swinging through the long distance of 3-4 of a mile with the implements of cultivation. The elevation with a gradual slope off to a hill 30 or 40 feet high gives air drainage. That is the Ganio apple, but the purpose of this illustration was to show the method of cultivating the tree row itself. Here we have clover between the trees. In this way the young tree is kept cultivated the first five or six years for the apple and all the time for the peach. The dwarf pears, as I said, are planted as fillers 10 feet apart, between the standards. These commenced to bear the second year they were out and gave me considerable profit the third year. It doesn't need to be cultivated as does the peach. There are pears on that tree weighing 18 ounces apiece; the third year the trees were in the ground they gave me 7 wagonloads that sold readily for 75 cents a half bushel basket wholesale to the wholesaler. This is the Ganio apple tree bearing a considerable quantity of fruit at the age of three years, showing again our method of cultivation of the rye stubble. We grew rye between the trees, but now the row cultivated.

Different varieties of trees are planted for pollenizers. There's a pear orchard three years of age and bearing. Even some of the standards are bearing; it can be seen that every other tree here is a standard, every other tree in the other direction is a dwarf, and between the tiers as secondary fillers there are currants. The currants have given us enough profit to pay for the land and tree and work done in the orchard, so the pay has come from the currants and the dwarf pears have been net profit. I plant the fast prolific and the cherry, chiefly. My friends, here is an illustration, showing clean cultivation. The spike harrow is the best after once cutting the land up in the spring with the disk harrow. There is a good view in the peach orchard. The spike harrow reaches far enough to let us do all the cultivation the trees will demand. The trees are 18 feet apart, but will be 20 after this. Eighteen is a little too close. Now what is all this for? Why are we doing this work? It is for fruit. We are after fruit of the best quality we can get and as soon as we can get it. Any method that will bring us good fruit in abundance, early, is certainly a method that should be adopted, and there is a new thing in an orchard only four years of age, it is not four years of age, because that is it's fourth summer. It was three years and four months after the trees were planted that that picture was taken and that orchard is now set with a heavy setting of fruit at the present time. Here is a photograph of an orchard at the end of the first year's growth. We had potatoes in the orchard, took them out, harrowed it in each direction and drilled in rye. At the end of the next summer or during the next summer the rye was taken off, chopped it with a disk harrow and crimson clover was sowed. The crimson clover simply caught and grew, a scattering growth. The next summer when it ripened, it was chopped up with a disk harrow and harrowed thoroughly over the field with a spike harrow, and here is the result. I never saw such a wonderful growth of vegetation as there, I mean, in an orchard and under any such circumstances. Now that picture was taken last year. That crimson clover lived through a temperature of 35 degrees below zero. One need not say to me any longer that crimson clover freezes out; it is not a matter of freezing the clover, it is a matter, perhaps, of cracking the roots by having it in a heavy soil. In my soil it does not kill the roots.

A Member: What effect does it have on the growing of the trees?

PROF. SURFACE: It certainly has not injured the trees. It is giving all the strong growth I desire. If it is going to make too much strong growth, I will cut it off. It is not reducing the growth to any less than what I want. If I think it is too much I will cut it off. I can hold it in check. There is danger of growing too much if we leave it in there and turn it down. Here is an orchard. See the young peach trees standing there, but we are growing lima beans between the trees, of course. There's a good crop of lima beans. Here is an orchard 2½ years of age. We are growing vegetables between the trees, cabbages and tomatoes. D. M. Wertz, who, until recently, has been the most extensive fruit grower in Pennsylvania, whose orchard is in Franklin county, started his trees regularly by the system here shown, which is in a corn field. This photograph was taken in the fall of the first year of his peach orchard. He plants his corn in hills and a tree stands just where a hill would come. Perhaps I should say that he plants his corn in such a way that the hill will come just where the tree stands, because the tree is planted before the corn is planted. It is cultivated in each direction

That is an interesting and wonderful picture, showing how a man with a growing crop gets profit from his orchard the first year by regular intercropping corn and potatoes. I have gone further than that; not only have I planted the corn, but instead of replanting with corn I replanted with sunflowers, that can be planted later than corn, and we have had a wonderful growth of sunflowers, which is the best poultry food we can grow. After the corn is taken off the land I keep the tree row constantly cultivated and you see the nice cultivation shown by that tree row. This shows the length of a tree row that I am planting. This picture shows the rye starting in the field. That was sowed with clover the next spring. Here is a pear orchard in the spring or summer just after the trees were set. That spring we planted in corn. We are looking up the pear row where it is cultivated—planted to corn. It was sowed to crimson clover at the last working of the corn and to oats and cow peas. Now notice, my friends, how I got in the legumes that year, the oats and cow peas. The next summer the oats were cut with a binder swinging right back and forth. The oats always kept cultivated and this year there's as heavy a stand of clover in that orchard as I have seen for many a day. Lieut. Col. Reynolds and Senator Clark, of Erie, stood and looked at it last Friday and said, "If we could get a stand of clover like that we can grow anything on that soil," and so you can. Where it drops down to a lower elevation of the land I have planted pears. In that pear orchard I went so far as to grow millet. The farmer is there, cutting millet with a one-horse mower, and the pear trees made a good growth because the row was kept cultivated. This is a picture in Westmoreland county, where the apple trees were kept cultivated in their rows, but there are blackberries and raspberries as the intercrop in that orchard, which can be done successfully if they be kept cultivated. Here is a picture in the orchard of Mr. Benj. Copelin, in the upper part of York county, where he has grapes as an intercrop between his apple trees and he has made good profit from his grapes. The bearing of this stalk is to show how the orchardist can get some profit of some kind before his fruit crop comes in or before his trees become so large as to demand all the soil.

It is the subject of economy of production, utilizing everything possible. I said that one of the important points is the growing of a cover crop. Here is an orchard in its third year. These are my inspectors and demonstrators gathered around this orchard, with crimson clover and cow peas turn about. That makes a combination as good as a person can get. It is no wonder that the next year, which was last summer, I took a magnificent crop of potatoes from between those trees. Here is a young orchard, edged by a lot of pear trees. This is a one-year peach. It does not show plainly, but the point before us is that corn was growing in that orchard and it was then sowed to crimson clover, and the dark areas there are mats of crimson clover. It is such a soil renewer that I have something to say to you now that is most remarkable. Down near Hanover, in York county—and I suppose Mr. Barnes knows of the case, too—there is a gentleman who for the past four years has sowed crimson clover just as the last working of his corn, in the corn, letting it grow as a cover crop that fall and winter, turning it down the next spring and planting corn again, using no manure and no fertilizer and increasing his yield each year 10 bushels above what it was the year previous, and that is a remarkable thing to say.

A Member: Do you sow your clover before or after you cultivate?

PROF. SURFACE: It does not make any difference whether it is immediately before or immediately after; if the soil be real loose and fresh at the time, I prefer to sow it immediately after the cultivator has run, because it is liable to be turned down too deep is sowed before the cultivator, but I don't want the soil to settle before it is sowed. The first year it may only give you a thin stand, but the next year the soil will be inoculated and give you a dense stand. Here is an apple tree, not sprayed, in the orchard of Irwin Slapin. We took his orchard for demonstration purposes. He sent me these photographs. There's an apple tree of the same age and kind that is sprayed. See how it is bowed down with its load of fruit. He told me that from an acre of that orchard that we used for demonstration purposes he took five hundred dollars' worth of fruit more than from any other acre in the orchard, and this is a fair showing of the results of spraying. This is from the orchard of Mr. Homer B. Howe, of Wellsboro, Tiogo county. It is as fine a showing as any western fruit that could be taken. Every fruit absolutely perfect, not a mark on there showing a blemish by a fungus disease nor a worm injury. Spraying gives perfect fruit and consequently helps to get a better yield and better prices and consequently reduces the cost—spraying with the right material. There are leaves curled by the aphis or plant louse. We used for that a concoction of arsenate of lead. Someone asked me why he had failed to kill the bugs with arsenate of lead, and I found out that the bugs he was praying were plant lice. If you will just mix a little molasses with the dope and spray with sweetened arsenate of lead, the louse will come and feed so greedily as to be poisoned.

Here is a photograph of a tree from Shannondale, Pa., which was killed by the insertion of a capsule made at Allentown and sold as Plexner's Scale Poison and Tree Fertilizer, and someone has said that the name should be reversed and it should be Plexner's Tree Poison and Scale Fertilizer. The owner of that tree paid a dollar to have the capsule put in at the place you see and it died, blighted up and down until the tree was gone. Scores and scores of persons came to me last summer and told me their trees had been killed by this treatment, yet the man is operating. The last I heard of him he was in Cumberland county about five miles from my own orchard. He works one county until he is shown up, then he moves to another. Do you think it possible that anyone owning a tree would hire a man to go there and put in a dose of dope of that kind, without knowing what yould happen and pay that price, a dollar, to have the tree treated and killed? There are many people who never have sense enough to succeed in horticulture, I assure you. I say, make your own material. There's myself and a farmer making our lime—sulphur solution. We are testing its strength with the hydrometer. You will never know if it is strong enough unless you do that. I use the ordinary cheap grade of commercial ground sulphur and I've got that batch I'm testing there stronger than any commercial material I have ever purchased. Think what that means, right there in the photograph, where the hydrometer is giving me a stronger test of concentrated lime-sulphur solution than any I ever saw taken from a barrel of commercial material, with a low grade of ground commercial sulphur costing $1.25 a hundred at that time.

A Member: How do you keep your solution from crystallizing?

PROF. SURFACE: Take off the red liquid and separate from the sediment right away and store it away. If we store it with the sediment it is liable to crystallize. The sediment is very useful. I keep it to itself and the next summer I paint it around the trunks of the peach trees to keep the bores from coming and injuring the trees. I use ordinary stone lime, quicklime; the best lime you get is from York, burned by the York Lime Co.

A Member: Is there any difference whether you use the ground sulphur—flour sulphur?

PROF. SURFACE: I use the cheapest grade because it is cheaper, that is all. This photograph shows an experiment of three kinds, the highest of all called flour of sulphur, the next grade called ground sulphur, and the next grade called commercial ground sulphur, and you get a stronger solution by the hydrometer reading from the lowest grade sulphur. I don't know why, only it was so. To make this concentrated lime-sulphur solution I boil two pounds of sulphur and one pound of stone lime in one gallon of water for one hour. That is the concentrated material. I dip it off from the sediment, store it away in a barrel and it will keep as long as you want it, years and years, if you desire. When I want to use it I dilute it to test it with a hydrometer; that hydrometer has directions with it given by the manfacturers, the Carbondale Instrument Company, of Carbondale, Pa. They mail it to you with full directions for use for one dollar. I am not interested in its sale, although they say it is made according to my specifications. It will make a material that can be safely diluted with about 1 to 8.

Notice the spraying of this peach tree; it is thoroughly sprayed from top to bottom, so that every particle is covered by the lime-sulphur solution. This tree shows something else that should interest you. It is just bursting into bloom. I photographed it as soon as it was dry after spraying. There's a peach tree three years of age. You can judge its size by the couple of little peaches. There may be some things that cannot be treated by a spray, but I haven't time to go into those questions now. You will get them in my Bulletin. An apple tree infested with San Jose scale. It is more economical to produce good fruit than more fruit. There is no reason why the scale insects should run riot in an orchard when they are as easily controlled as they are. One good, thorough spraying when the trees are dormant, using material strong enough, will destroy the scale. I said at the right time. The buds here shown are not open far enough to be sprayed. Blossoms with the petals open are too early to be sprayed. The fruits here shown have gone past the proper stage for spraying. The calyx points were closed; where they are just ripe, the calyx points are wide open and it is the time to get your arsenate of lead down there and it will never be injured by the Codling moth. Oftentimes insects will come and if allowed to remain in the tree until nearly grown they will be hard to kill. Spray while young. Live among your trees, as Prof. Wittman lives among his poultry, as Prof. Watts lives in his greenhouse, as a successful dairyman lives with his cattle. When the first evidence of these things comes, spray them. A material half as strong will clean them up then, whereas one twice as strong may not clean them up later. They are easier killed while young and that is before the damage is done to the tree, by removing its leaves, which are both the lungs and stomach of the tree. Spray while the trees are dormant and use the lime-sulphur solution.

The great berry moth—I know a doctor in Cumberland county, who got an ordinary tin spray that cost him only one dollar, and sprayed his grape vines with that, but it blew a mist, like an atomizer, over his grapes. He used arsenate of lead and he said, "We have had the finest crop of grapes we have ever seen grown in this part of the country." It doesn't make much difference what kind of apparatus you use, so it will do the work and spread the spray evenly over the trees. We think we have some pests in this country, but see the green tree moth or gypsy moth in Massachusetts. They have already spent over three million dollars and they are not wiping them out, simply trying to keep them from spreading into the trees of the surrounding country. Thin the fruit. This branch had twice as many peaches on it as it should have. If it is a young, vigorous tree, this might be left. If the fruit is not thinned, you have too many different sizes on the tree, which demands grading, and there is no economy in that.

Here are peaches on a tree not thinned; you will notice the small and large side by side. A small fruit, even though well grown, in a package with large fruit, will kill the sale of the large and the large will spoil the sale of the small, and you have got to grade two or three sizes to sell with the best results. There are the pickers in my orchard, thinning the fruit. The trees are low enough so that I can hire women. I have one experienced man thinner to work through there, pulling the fruit from the trees, so they can just pass their hand between the fruit that is left on the trees. As a result of that thinning, which cost me fifty dollars, a gentleman from Clearfield came in my orchard just before the fruit was ripe, saw it on trees, made a contract for it, and after he paid me a hundred dollars, he said, "Now, I want to tell you, that is the first orchard of strictly fancy fruit I have ever seen," and he said, "It's my fruit, I bought it; now you follow my directions (now note the point). "I want you to take your baskets out under those trees at the time of picking, pick the fruit from the trees exactly as it comes, because there is no grading there to be done, fill the baskets, put the covers on, and haul them away to the ice car; rush the thing right through." We did it; we filled the car in the afternoon. We had no grading to do, because the fruit was graded by the thinning on the trees, and when I got $600 for that carload of fruit I felt that it was doing pretty well under the circumstances.

Note the even distribution of this fruit, the large size of the fruit. You will have the fruit bearing from top to bottom and throughout the entire tree by the process of thinning, and what is more, the tree will not overbear; you don't have a heavy crop one year and dearth of a crop the next year. By letting the tree bear only what it properly can, it will set the fruit buds for the next year and you will have a crop the next year. The low shaped tree, the low, open-headed spreading tree will droop outward, as you see this tree. There is a peach tree four years and five months of age, that gave me 11 baskets of peaches to the tree, which sold right there in the orchard for $1.25 a basket. On account of the shape of the tree, from over 45 acres of bearing fruit trees, there was only one broken branch. This is something different. There's a tree that was not thinned and was not properly sprung. That's a young orchard a mile from my own. There's a Ben Davis apple tree that bore 17 baskets of apples when 8 years of age. That's straight, but it broke itself all to pieces in the process of bearing. What a deformed tree one will have there, unless you cut that top clear up here, cut off the broken limb and build a new top on it entirely. Had it been low enough and the fruit fairly thinned it would have stood and borne year after year. There are two peach trees the same age and kind, both injured by winter freezing. This was cut back and gave a dense top. This was not cut back. There is a poor tree and there is a good tree. Cutting back after freezing will give you good trees. This is a peach tree in the orchard of Dr. B. M. Stone, of New Freedom, York county, injured by spraying it with scale acid. This he didn't cut back; this he did, and they grew new tops and he had good trees afterwards, after freezing. Here is a tree that it would not pay to cut back. The proper thing to do, instead of spending time waiting for that tree is to tear it out and put in a new tree this fall.

A Member: In what way does the scale injure trees?

PROF. SURFACE: It enters lenticils, enlarges them considerably and starts the death of the bark at the base of the natural bark. Mr. Tyson, for the past two years, has sprayed with lime-sulphur solution instead of scalicide. His packer a year ago said he could not find enough fruit free from scale to justify his trying to pack it properly. After Mr. Tyson, for two years, sprayed with lime-sulphur solution instead of scalicide, the same packer said, "I can find lots of good, clean fruit now and pack faster." Here is a tree that was not properly cut back, not cut back far enough. It gives a new growth to the top way up there where it is already too high. The crimson clover gives a good winter cover crop and nitrogen to the soil. Here we are mowing the crimson clover and swing right back on the other side and have no trouble in mowing there. The owner of the orchard is driving the mower in that case. Vetch is a great soil manure, a great cover crop, and if you are too far north for crimson clover to do well, I certainly recommend the use of vetch. We are there making in an ordinary open kettle in an outdoor shanty, the boiled lime-sulphur solution.

Here is a man who can read and write, but has little other education, who makes the solution when I am not there, and he makes as good a solution as I or any other person can make. Don't be misled by the agents of manufacturers who tell you that it needs an expensive laboratory and special chemical knowledge to make your own sulphur solution. Any vessel will do except copper. I have used an iron washtub. Peach tree and apple tree borers have to be got out by washing the trees with lime-sulphur solution the first of the months of June, July and August. Repeat that as I direct and you will be able to keep the borers out of your tree, but one application alone will not do it. The tent caterpillar is unusually bad this year. Don't attempt to burn them out, but spray for them. The apple tree borer. Where this is in the tree, don't take the old method of cutting it out with a knife; it injures the trees and is a slow process. Put into a spring bottom oil can, the material known as carbon bisulphide. Insert the tip of that oil can into the hole made by the borer, send a jet of the liquid into that hole, close it up by clay or mud. The fumes will go all through that hole, however winding it may be, killing the grub, and it will not injure the tree like cutting. Now, that is worth something, worth knowing, for you who have the borers in your trees. There is just one genus of beneficial insect; that is the ground bettle. Of about 30 or 40 different kinds, there are more of our insects that are beneficial than are injurious. There is one that feeds upon plant lice; there is one eating the pear tree cilia. We should preserve our insectivorous birds as well as the beneficial insects. Only recently I have had complaint of the effects of mice and rabbits girdling trees. We should preserve their natural enemies and fight against the bounty on hawks and owls, which is now proposed. From the blossom to the fruit should be our purpose. We live in a progressive age and we may not expect it to be long until we will be spraying our trees by the latest inventions of science, by an aeroplane carried over the orchard.

The CHAIRMAN: This completes our program for this evening. I believe this session covers the full Institute, so that it will not be called in session tomorrow morning. The meeting now stands adjourned.

A. L. MARTIN,
Director of Institutes.

V 33

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

BULLETIN No. 242

# TABULATED ANALYSES OF
# Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE
WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

**From January 1 to August 1, 1913**

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

## OATH OF FERTILIZER SAMPLING AGENT.

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Commonwealth of Pennsylvania, ss:

Personally appeared before me, ..................................................... of ....................County of ....................... and State of Pennsylvania, who being duly sworn, according to law, doth depose and say: That he has been duly appointed an agent of the Department of Agriculture of Pennsylvania to collect samples of Commercial Fertilizers for analysis, that he is not in any way interested in the manufacture or sale of any fertilizer, and that he will perform the duties of the office with fidelity in accordance with the requirements of law to the best of his ability, and as set forth in the instructions issued by the Secretary of the Department of Agriculture governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this
................. day of ..........
A. D. ..............................
.......................................

(Signed), ...............

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DEPARTMENT OF AGRICULTURE

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Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE.
COMMONWEALTH OF PENNSYLVANIA.

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# The Act of 1st May 1909, Commonly Referred to as "The New Fertilizer Law" is as Follows:

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## No. 205.

## AN ACT

**To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.**

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand of trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year: and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more then one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of

business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, or any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

## No. 95.

## AN ACT

**Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.**

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

State College, Pa., July 16, 1913

Hon. N. B. Critchfield, *Secretary of Agriculture, Harrisburg, Pa.*

Dear Sir: I have the honor to transmit herewith my report upon the analysis of the samples of commercial fertilizers received from official sampling agents during the spring season of 1913.

Very respectfully,

WM. FREAR,

*Vice-Director and Chemist.*

The Penna. State College Agricultural Experiment Station.

## FERTILIZER VALUATIONS.

The object of an official valuation of commercial fertilizers is to enable the consumer to judge approximately whether he has been asked to pay for a given brand more than the fertilizing ingredients it contains and market conditions prevailing at the time would warrant. It is clear, therefore, that no attempt is made in this valuation to indicate whether the fertilizer valued possesses a greater or less crop-producing capacity than another fertilizer; but only whether it is higher priced than another of the same general composition.

For this purpose the valuation must be so computed as to include all the elements entering into the cost of a fertilizer as it is delivered to the consumer. These elements as they occur in the usual transaction, which is a time purchase in small quantity from a local dealer or agent, may conveniently be grouped as follows:

1. The wholesale cost of the ingredients.
2. The jobbers' gross profit on the sale of the ingredients; this includes office expenses, advertising, losses, etc.; for the purpose of the present computation it may be assumed that the sum of this gross profit and the wholesale cost of the ingredients, is equivalent to the retail price of the single ingredients near the wholesale markets in ton lots of original packages for cash.
3. The expense and profit of mixing: This item applies only to complete fertilizers, rock and potash, and ammoniated rock; not to dissolved or ground bone, or to dissolved rock.
4. The expense and profit of bagging.
5. Agents' commission: This item includes not only the commission, proper, but every advance in price due to the sale of the goods through an agent in small quantities on time, rather than directly to the consumer in ton lots for cash.
6. Freight from the wholesale market to the point of delivery.

The valuations for 1912 were based:

1. Upon the wholesale prices from September 1, 1912; to March 1, 1913, of the raw materials used in fertilizer manufacture, the quotations of the New York market being adopted for all materials except acidulated phosphate, rock and ground bone.
2. Upon an allowance of 20 per cent. of the wholesale prices, above mentioned, to cover jobbers' gross profit.

By adding the 20 per cent. allowed for jobbers' gross profit to the wholesale price of the several raw materials, the retail price in original packages at the jobbers' warehouse is obtained.

Since the amount of the several valuable fertilizing constituents in the various raw materials is known, it is a simple matter to determine the corresponding retail value per pound of the valuable fertilizing constituents yielded by each raw material. A schedule of these pound values affords a convenient basis of computation of the value per ton of various fertilizers, whose composition is ascertained by analysis.

The values assigned, for the present ,to the other elements in the cost of the fertilizer at the point of delivery are:

3. For mixing, $1.00 per ton.
4. For bagging, $1.00 per ton, in all cases except those in which the article was sold in original packages; the cost of the package being, in such cases, included in the wholesale price.
5. For agents' commission, 20 per cent. of the cost of the goods f. o. b. at the jobbers' or mixers' warehouse.
6. For freight, $2.00 per ton; the cost of the freight in lots of twelve tons or over, from the seaboard to Harrisburg, averaging $1.88 per ton.

The following valuation of dissolved South Carolina rock illustrates the method:

| Phosphoric Acid. | % | Weight per ton. | |
|---|---|---|---|
| Available, | 11.00 | 280 lbs. at 3c., | $8.40 |
| Insoluble, | 1.00 | 20 lbs. at 1½c., | .30 |
| Retail cash value of ingredients, | | | $8.70 |
| Bagging, | | | 1.00 |
| Cash value of goods ready for shipment, | | | $9.70 |
| Agents' commission, 20 per cent., | | | 1.94 |
| Freight, | | | 2.00 |
| Commercial value per ton, | | | $13.64 |

It is not to be expected, of course, that the valuations thus computed will precisely represent the fair price to be charged for a brand in each locality and in every transaction. Market conditions, competition, distance from factory, all introduce minor variations. Nevertheless, to make the approximation reasonably close the average valuation of a given class of goods ought to agree closely with its ascertained average selling price. Whenever such an agreement is no longer obtained by the use of a schedule, it is evident that the schedule of retail values of the constituents, or the added allowances for mixing, etc., requires revision.

It is needful to note here another factor greatly affecting the practical accuracy of these approximations. Their computation would offer little difficulty and their usefulness be far greater, if, by the ordinary methods of analysis, the exact nature of the ingredients used to supply the several fertilizer constituents, were capable of certain determination. This is, however, possible to-day to only a limited extent. The valuations are therefore based on the assumption that the fertilizers are uniformly compounded from high quality ingredients, such as are commonly employed in the manufacture of fertilizers of the several classes. Consumers should carefully avoid the error of accepting such valuations as infallible; they are not designed to be used for close comparisons of single brands, but only to indicate whether the price asked for a fertilizer is abnormal, assuming good quality for the ingredients used. From this it is clear that, *except as high freights may require, the selling price of a brand should not far exceed the valuation; but that a fertilizer may be made of inferior materials and yet have a high valuation.*

*Except where othrewise expressly stated, the valuations given in the analytical tables are not suited as guide to the prices for goods bought for cash, in large quantity, and directly from the manufacturer, importer, or jobber.*

The valuations used during 1911 were modified for use during 1912 in accordance with the changes in wholesale prices of fertilizing ingredients and to make the valuations more closely follow the selling price.

The following comparative statement shows the valuations and selling prices of the several classes of fertilizers during 1908 to 1912.

| Fertilizers. | Number of samples. | Valuation. | Selling price. | Difference of valuation from selling price. |
|---|---|---|---|---|
| Spring, 1908. | | | | |
| Complete, | 455 | 26.23 | 25.69 | .54 |
| Rock-and-potash, | 108 | 16.24 | 16.96 | —.62 |
| Dissolved bone, | 4 | 23.09 | 21.11 | 1.98 |
| Ground bone, | 21 | 28.96 | 29.04 | —.08 |
| Dissolved rock, | 33 | 14.92 | 14.72 | .20 |
| **Fall, 1908.** | | | | |
| Complete, | 287 | 23.88 | 22.34 | 1.54 |
| Rock-and-potash, | 104 | 16 17 | 16.43 | —.26 |
| Dissolved bone, | 6 | 26.05 | 22.48 | 3.57 |
| Ground bone, | 30 | 27.90 | 29.18 | —1.28 |
| Dissolved rock, | 49 | 14.86 | 14.31 | .55 |
| **Spring, 1909.** | | | | |
| Complete, | 426 | 25.31 | 24.88 | —.43 |
| Rock-and-potash, | 111 | 15.94 | 16.98 | —1.40 |
| Dissolved bone, | 8 | 21.57 | 22.25 | —.68 |
| Ground bone, | 24 | 30 28 | 30.70 | —.42 |
| Dissolved rock, | 33 | 13.62 | 14.76 | —1.14 |
| **Fall, 1909.** | | | | |
| Complete, | 255 | 22.25 | 22.07 | 14 |
| Rock-and-potash, | 92 | 15.50 | 16.10 | —.60 |
| Dissolved bone, | 3 | 22.85 | 24.50 | —1.65 |
| Ground bone, | 26 | 28.71 | 29.39 | —.68 |
| Dissolved rock, | 41 | 14.02 | 13.86 | .16 |
| **Spring, 1910.** | | | | |
| Complete, | 436 | 26.63 | 25.26 | 1.37 |
| Rock-and-potash, | 123 | 16.08 | 17.16 | —1.08 |
| Dissolved bone, | 8 | 21.47 | 22.17 | —.70 |
| Ground bone, | 24 | 30.27 | 30.19 | .08 |
| Dissolved rock, | 47 | 14.00 | 14.56 | —.56 |
| Fall, 1910. | | | | |
| Complete, | 294 | 22.24 | 21.76 | .48 |
| Rock-and-potash, | 109 | 16.34 | 16.38 | —.04 |
| Dissolved bone, | 4 | 25.70 | 25.80 | —.10 |
| Ground bone, | 29 | 31.10 | 29.98 | 1.12 |
| Dissolved rock, | 32 | 14.15 | 14.01 | .14 |
| Spring, 1911. | | | | |
| Complete, | 485 | 25.95 | 24.97 | .98 |
| Rock-and-potash, | 129 | 15.99 | 17.05 | —1.06 |
| Dissolved bone, | 6 | 23.82 | 20.13 | 3.37 |
| Ground bone, | 23 | 31.47 | 30.93 | .54 |
| Dissolved rock, | 51 | 14.86 | 15.83 | —1.58 |

| Fertilizers. | Number of samples. | Valuation. | Selling price. | Difference of valuation from selling price. |
|---|---|---|---|---|
| Fall, 1911. | | | | |
| Complete, | 292 | 22.33 | 21.73 | .61 |
| Rock-and-potash, | 129 | 16.07 | 16.25 | —.18 |
| Dissolved bone, | 3 | 21.51 | 24.88 | —3.37 |
| Ground bone, | 25 | 31.18 | 31.17 | .01 |
| Dissolved rock, | 42 | 13.78 | 14.00 | .22 |
| Spring, 1912. | | | | |
| Complete, | 470 | 27.24 | 27.64 | .40 |
| Rock-and-potash, | 137 | 16.26 | 18.27 | 2.01 |
| Dissolved bone, | 4 | 18.92 | 20.94 | 2.02 |
| Ground bone, | 24 | 33.26 | 32.81 | .45 |
| Dissolved rock, | 43 | 14.20 | 14.69 | .49 |

The following statement from the weekly reports of the Oil, Paint and Drug Reporter, of New York City, shows the average wholesale prices of fertilizer raw materials from September 1, 1910, to March 1, 1911, and from September 1, 1911, to March 1, 1912.

| Substance. | Amount Priced. | Average price Sept. 1, 1911, to March 1, 1912. | Average price Sept. 1, 1912, to March 1, 1913. | Prices Sept.-March, 1912-1913, in per cent. of prices of 1911-1912. |
|---|---|---|---|---|
| Sulphate of ammonia, | Cwt., | 3.196 | 3.28 | 102.6 |
| Nitrate of soda, | Cwt., | 2.224 | 2.56 | 115.1 |
| Dried blood, H. G., | Unit (20 lbs.), | 3.019 | 2.736 | 90.6 |
| Concentrated tankage, | Unit (20 lbs.), | 2.542 | 2.40 | 94.4 |
| Rough bone, | Ton, | 23.12 | 23.25 | 100.5 |
| Bone meal, | Ton, | 29.05 | 29.25 | 100.7 |
| Fish guano, dry, | Unit (20 lbs.), | 3.228 | 3.113 | 96.3 |
| Phosphate rock, Tenn., | Ton, | 5.25 | 5.25 | 100.0 |
| Acid phosphate, | Unit (20 lbs.), | .525 | .525 | 100.0 |
| Double manure salt, | Ton, | 24.66 | 24.95 | 101.1 |
| Sulphate of potash, | Ton, | 46.58 | 46.80 | 100.4 |
| Kainit, | Ton, | 8.333 | 8.45 | 101.4 |
| Muriate of potash, | Ton, | 38.18 | 38.55 | 100.9 |
| Sulphuric acid, 66 degrees B., | Cwt., | 1.05 | 1.05 | 100.0 |

In ammoniates such as dried blood and fish guano, the unit is of ammonia, of which 82.25 per cent is nitrogen; in acid phosphate the unit is of phosphoric acid (phosphorus pentoxid).

There has been a decided fall in the prices of some of the organic ammoniates, and a slight increase in the cost of nitrogen from inorganic sources. This places the two great classes of ammoniates upon practically the same basis, as concerns commercial values.

Acid phosphate, phosphate rock and sulphuric acid show no change in prices compared with last year.

Potash Salts: The New York Oil, Paint and Drug Reporter gives the following imports of potash salts for the years 1911 and 1912.

| | 1911. | 1912. |
|---|---|---|
| Muriate of potash, | 509,119,173 | 482,265,665 |
| Sulphate of potash, | 121,039,192 | 97,161,010 |
| Kainit and manure salt, | 737,852 | 683,202 |

Composition of Raw Materials.—In order to form a correct idea of the cost per pound of the fertilizer constituents of these materials, it is needful to determine their composition or, in other words, the quantities of valuable constituents each contains. The following table shows the composition of raw materials used in the manufacture of fertilizers. Few analysis of these materials, with the exception of ground bone and dissolved rock, have been made in Pennsylvania. The figures in the following table; include the averages of the results made in Connecticut, New Jersey and Massachusetts during the past year, except in the case of ground bone and dissolved rock phosphates, where Pennsylvania results alone are included.

### Composition of Non-Acidulated Fertilizer Ingredients, (Per Cent.)

| Substance. | Number of samples analyzed. | Nitrogen. | Potash. | Total phosphoric acid. |
|---|---|---|---|---|
| Sulphate of ammonia, | 7 | 20.49 | .......... | .......... |
| Nitrate of soda, | 31 | 15.43 | .......... | .......... |
| Dried blood, | 10 | 12.15 | .......... | .......... |
| Ground bone, | 28 | 3.19 | .......... | 22.95 |
| Tankage, | 25 | 6.12 | .......... | 10.13 |
| Ground fish, | .......... | .......... | .......... | .......... |
| Cottonseed meal, | 295 | 6.58 | .......... | .......... |
| Castor pomace, | 3 | 4.69 | 1.02 | 1.75 |
| Sulphate of potash, | 13 | .......... | 49.09 | .......... |
| Muriate of potash, | 33 | .......... | 51.16 | .......... |
| Kainit, | 10 | .......... | 13.62 | .......... |
| Double sulphate of potash and magnesia, | .......... | .......... | .......... | .......... |

Composition of Acidulated Fertilizer Ingredients. (Per Cent.)

| | Number of samples. | Total phosphoric acid. | Insoluble phosphoric acid. | Nitrogen. |
|---|---|---|---|---|
| Dissolved bone, | 5 | 13.75 | 3.18 | 1.56 |
| Dissolved phosphate rock, | 60 | 15.35 | 1.02 | .......... |

Cost per Pound of Fertilizer Constituents.—With the composition of these raw materials and their price per ton, hundred weight, or other unit of measure as a basis, the wholesale cost per pound of the valuable constituents can readily be calculated. In many cases the ammoniates are quoted "per unit of ammonia," the term unit being equivalent to per cent.; in goods sold by the ton of 2,000 lbs., the unit is equal to 20 lbs., and 20 lbs. of ammonia contain 16,47 lbs. of nitrogen.

In the case of refuse bone-black, unacidulated, the mean, 28.25 per cent. of phosphoric acid, is assumed to represent the average material on the market.

Phosphate rock is sold by the ton of 2,240 lbs., and on the basis of the bone phosphate of lime it contains, with drawbacks for injurious constituents. Bone-phosphate of lime contains 45.8 per cent. of phosphoric acid; therefore, each per cent. of bone phosphate in a long ton is equivalent to 22.4 lbs., and contains 10.26 lbs. of phosphoric acid.

In the wholesale trade, dried blood, azotine ,concentrated tankage and hoof meals are usually sold on the basis of ammonia, disregarding the phosphoric acid present.

Insoluble phosphoric acid in dissolved rock is likewise ommitted from consideration, contracts being based solely upon the "available" phosphoric acid; nor in rock phosphates is any claim made for the small quantities of nitrogen and potash they contain, nor in dissolved bone for the potash present.

Under these conditions, the wholesale cost per pound in New York of the valuable constituents of such materials as furnish but a single fertilizing element, these materials being assumed to be in the state of preparation and in the packing in which the manufacturer purchased them, are given in the following table; also a figure representing a fair retail price at the factory, the materials having undergone no change in treatment or packing and the allowance for expenses and profit in retailing being 20 per cent.

## Wholesale Cost per Pound of Fertilizing Constituents, New York.

### 1. Ingredients Supplying One Constituent.

| Materials. | Constituents Valued. | Wholesale price, cents. | Wholesale price plus 20 per cent., cents. |
|---|---|---|---|
| Sulphate of ammonia, | Nitrogen, | 16.01 | 19.21 |
| Nitrate of soda, | Nitrogen, | 16.59 | 19.91 |
| Dried blood, | Nitrogen, | 16.54 | 19.85 |
| Concentrated tankage, | Nitrogen, | 14.54 | 17.45 |
| Phosphate rock, Tenn., 78 per cent., | Phosphoric acid, total,* | .73 | .88 |
| Acid phosphate, | Phosphoric acid, available, | 2.63 | 3.16 |
| Double sulphate of potash and magnesia, | Potash, | .......... | .......... |
| Sulphate of potash, | Potash, | 4.77 | 5.72 |
| Kainit, | Potash, | 3.11 | 3.73 |
| Muriate of potash, | Potash, | 3.77 | 4.52 |

*The prices of phosphate rock are f. o. b. at the respective points of shipment, not New York. The prices for potash are taken from the schedule of the syndicate, and those of the remainder from the Oil, Paint and Drug Reporter.

The quotations for bone are given without specific reference to quality, so that it is impossible, from these data, fairly to apportion their several wholesale values to the nitrogen and phosphoric acid contained in this material. As compared with tankage, the general tendency is to assign a higher commercial rating to the phosphoric acid in bone, and to nitrogen, a rating not very different from that given in tankage.

In former years, the value assigned to the nitrogen has been the same as that quoted on crushed tankage, c. a. f. Baltimore. In later years, quotations for both crushed tankage and ground tankage have not been available, and for that reason, the value of bone nitrogen is based upon the quotations for concentrated tankage.

In earlier years, quotations on ground tankage have been about 5 per cent. in advance of those on concentrated tankage, also quotations on crushed tankage were on an average 12.67 per cent. in advance of these on ground tankage. Increasing the price of concentrated tankage by these percentages, we have $2.83 per unit of ammonia as the value assigned to the nitrogen in bone.

This is equivalent to $3.44 per unit of nitrogen.

The average composition of the ground bone and bone meal samples analyzed last fall in Pennsylvania was: Phosphoric acid, 22.95 per cent.; nitrogen 3.19 per cent.

The prepared bone contains less fat and moisture, and often less nitrogen than the ordinary rough bone, but these differences tend, in a measure, to neutralize each other. Assuming for the rough bone quoted in the New York market the same composition as the bone meal sold in Pennsylvania, and for the value of the nitrogen $3.44

per unit, as previously stated, the values per pound of the several constituents would be:

### Wholesale Cost per Pound of Fertilizer Constituents, New York.

### II. Bone.

| Materials. | Constituent Valued. | Wholesale price, cents. | Wholesale price, plus 20 per cent. |
|---|---|---|---|
| Rough bone, | Nitrogen, | 17.20 | 20.64 |
| | Phosphoric acid, | 2.68 | 3.22 |
| Ground bone, | Nitrogen, | 17.89 | 21.48 |
| | Phosphoric acid, | 2.79 | 3.35 |

## Valuation in Neighboring States.

It is desirable, from all points of view, that the schedules of valuation throughout a district in which similar market conditions prevail, should differ as little as possible. It has been our practice in the past, to conform our schedule to that adopted after very careful cooperative study of the market conditions for each year, by the New England States, New York and New Jersey, except where the peculiar conditions of our markets have been made the valuations diverge too largely from the actual selling prices, as in the case of ground bone and dissolved rock phosphates. The schedules for these States for 1912 and 1913 are as follows:

### Trade Values Adopted by the New England States and New Jersey.

| | Cents Per Pound. | | Values in 1913 in per cent. of those in 1912. |
|---|---|---|---|
| | 1912. | 1913. | |
| **Nitrogen,** | | | |
| In nitrates, | 16½ | 18½ | 112.1 |
| In ammonium salts, | 16½ | 18½ | 112.1 |
| In dry and fine ground fish and blood, | 22 | 20 | 90.9 |
| In fine bone and tankage and mixed fertilizers, | 19 | 19 | 100.0 |
| In coarse bone and tankage, | 15 | 15 | 100.0 |
| **Phosphoric Acid:** | | | |
| Water soluble, | 4½ | 4½ | 100.0 |
| Citrate soluble, | 4 | 4 | 100.0 |
| In fine ground bone and tankage, | 4 | 4 | 100.0 |
| In coarse bone and tankage, | 3½ | 3½ | 100.0 |
| In mixed fertilizers, insoluble, | 2 | 2 | 100.0 |
| **Potash:** | | | |
| In forms free from muriate, | 5½ | 5½ | 100.0 |
| As muriate, | 4½ | 4½ | 100.0 |

## Valuations in Pennsylvania.

For reasons stated on the previous page, the New England schedule has been followed in the case of mixed fertilizers and dissolved bones.

In the case of the dissolved rocks, the wholesale prices of raw materials used in their manufacture and of the available phosphoric acid itself, having shown no material change, the values used in the Pennsylvania schedule for 1912 are continued for use during the present year.

With respect to the potash and nitrate salts, the experience of recent years has shown a growing increase in the proportion of the official samples that represent direct cash purchases in large quantities. The result has been that the commercial valuations, based upon the conditions and costs of sale in small quantities, through local agents and on time, came to be, in a large fraction of the cases represented by these salts whose analyses are reported in the miscellaneous group, strikingly higher than the selling prices quoted. *For this reason, it has appeared needful to proceed, hereafter, upon the assumption that all potash and nitrate salts sold unmixed as such, have been purchased at what an virtually jobbers 'prices plus freight, and to adopt corresponding pound values. In the case, however, of potash and nitrogen in mixed fertilizers, the computation will be made as heretofore, upon the assumed basis of sale on time, in small quantities and* through local dealers. ...............................................

Buyers who are interested in the comparative jobbing prices of other materials, will find the data in the preceding pages.

The entire schedule adopted for use in this State is presented in the following table.

### Pennsylvania Schedule of Values for Fertilizer Ingredients, 1913.

| | Cents Per Pound. |
|---|---|
| **Nitrogen:** | |
| In ammonia salts, | 18½ |
| In nitrates, | 18½ |
| In meat, dried blood and mixed fertilizers, | 19 |
| In fine ground bone and tankage, | 17 |
| In coarse bone and tankage, | 15 |
| **Phosphoric Acid:** | |
| Available, in bone fertilizers, | 4½ |
| Available, in rock fertilizers, | 4 |
| Insoluble in ammonium citrate, in bone fertilizers, | 2 |
| Insoluble in ammonium citrate, in rock fertilizers, | 1½ |
| In fine bone, tankage and fish, | 3½ |
| In coarse bone and tankage, | 2½ |
| **Potash:** | |
| In high grade sulphate or forms free from muriate, | 5½ |
| As muriate, | 4½ |

*Potash in excess of that equivalent to the chlorin present, will be valued as sulphate, and the remainder as muriate.* The analytical tables frequently show little or no potash reported as sulphate, although the full percentage guaranteed is reported present ,and although the manufacturer has guaranteed that it was introduced as sulphate. This discrepancy between analytical report and guaranty may be due to the rule of practice stated in the first sentence of this paragraph, and not to any act of bad faith on the part of the manufacturer. The rule of practice is adopted chiefly for the reason that plants injured, like tobacco and sometimes potatoes, by an excess of chlorin, is injured equally, whether the chlorin be introduced as muriate of potash, as common salt, or as magnesium chloride. At present prices for the two potash salts, muriate and sulphate, the only weightly reason for introducing the more costly sulphate, is to insure the purchaser of tobacco and potato fertilizers against possible injury by chlorin. Under our system of valuation, the manufacturer must exclude chlorin from every source to gain the valuation advantage from his use of sulphate of potash.

In certain cases where specific claim is made by the manufacturer that potash has been added as carbonate, potash in excess of that equivalent to soluble chlorides and soluble sulphates will be valued as carbonate.

Nitrogen in mixed fertilizers will be valued as derived from the best sources of organic nitrogen, unless clear evidence to the contrary is obtained.

Phosphoric acid in mixed fertilizers is valued at bone phosphoric acid prices, unless clearly found to be derived from rock phosphate.

Bone is sifted into two grades of fineness: Fine, less than 1-50 inch in diameter; coarse, over 1-50 inch in diameter.

The result obtained by the use of this schedule does not cover the items of mixing, bagging, freight and agents' commission. To cover these, allowances are made as follows:

For freight, an allowance of $2.00 per ton on all fertilizers.

For bagging, an allowance of $1.00 per ton on all fertilizers, except when sold in original packages.

For mixing, an allowance of $1.00 per ton on complete fertilizers and rock-and-potash goods.

For agents' commission, an allowance of 20 per cent. is added to the cash value of the goods ready for shipment.

## FERTILIZER ANALYSES JANUARY 1, TO AUGUST 1, 1913.

Since January 1, 1913, there have been received from authorized sampling agents two thousand two hundred and thirty-three fertilizer samples, of which seven hundred and sixty-nine were subjected to analysis. Preference is given to those which have not been recently analyzed. In cases where two or more samples representing the same brand were received, equal portions from several samples were united, and the composite sample was subjected to analysis.

The samples analyzed group themselves as follows: 531 complete fertilizers, furnishing phosphoric acid, potash and nitrogen; 4 dissolved bones, furnishing phosphoric acid and nitrogen; 140 rock-and potash fertilizers, furnishing phosphoric acid and potash, 43 acidulated rock phosphates, furnishing phosphoric acid only; 32 ground bones, furnishing phosphoric acid and nitrogen, and 19 miscellaneous samples, which group includes substances not properly classified under the foregoing heads.

The determinations to which a complete fertilizer is subjected are as follows: (1) Moisture, useful for the comparison of analyses, for indication of dry condition and fitness for drilling, and also of the conditions under which the fertilizer was kept in the warehouse. (2) Phosphoric acid—total and insoluble; that is, that portion not soluble in water nor in warm ammonium citrate solution (a solution supposed to represent the action of plant roots upon the fertilizer), which is assumed to have little immediate food value. By difference, it is easy to compute the so-called "available" phosphoric acid. (3) Potash soluble in water—most of that present in green sand marl and crushed minerals, and even some of that present in vegetable materials such as cotton-seed meal, not being included because insoluble in water ever after long boiling. (4) Nitrogen—This element is determined by a method which simply accounts for all present, without distinguishing between the quantities present in the several forms of ammonium salts, nitrates or organic matter. (5) Chlorin—this determination is made to afford a basis for estimating the proportion of the potash that is present as chlorid or muriate, the cheaper source. The computation is made on the assumption that the chlorin present, unless in excess, has been introduced in the form of muriate of potash; but doubtless there are occasional exceptions to this rule. One part of chlorin combines with 1.326 parts of potash to form the pure muriate; knowing the chlorin, it is, therefore, easy to compute the potash equivalent thereto. (7) In the case of ground bone, the state of sub-division is determined by sifting through accurately made sieves; the cost of preparation and especially the promptness of action of bone in the soil depend very largely on the fineness of its particles, the finer being much more quickly useful to the plant.

The preceding paragraph sets forth the nature of the examinations given to the several classes of fertilizers under the laws in force prior to the present year. The legislation of 1909 has made needful, however, some additional tests. Section 4, of the Act of May 1, 1909, prohibits the sale of "pulverized leather, hair, ground hoof, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact." All nitrogenous fertilizers have, therefore, been submitted to a careful microscopic examination, at the time of preparing the sample for analysis, to detect the presence of the tissues characteristic of the several materials above named. The act of April 23, 1909, makes it unlawful to use the word "bone" in connection with, or as part of the name of any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone. All fertilizers in whose name the word "bone" appears, were therefore examined by microscopic and chemical methods to determine, so far as possible with present knowledge, the nature of the ingredient or ingredients supplying the phosphoric acid. It is a fact, however, well known to fertilizer manufacturers and which should be equally understood by the consumer, that it is, in certain cases, practically impossible to determine the source of the phosphoric acid by an examination of the finished fertilizer. The microscope shows clearly the structure of raw bone, but does not make it possible to discriminate between thoroughly acidulated bone and acidulated rock. The ratio of nitrogen to phosphoric acid in a raw bone—and only such bone as has not been deprived of any considerable proportion of its nitrogenous material by some manufacturing process can properly be called "pure animal bone"—is about 1:8; in cases where the ratio of nitrogen to phosphoric acid exceeds 8, it is clear that part, at least, of the phosphoric acid has been supplied by something else than pure animal bone; but, inasmuch as nitrogen may have been introduced in some material other than bone and no longer detectible by the microscope, the presence of nitrogen and phosphoric acid in the proportions corresponding to those of bone is not proof positive that they have been supplied by bone. Finally, the differences in the iron and silica content of bone and rock respectively, afford means of distinction useful in some cases; the usefulness of this distinction is limited, however, by the facts that kitchen bone frequently contains earthly impurities rich in iron and silica, and that earthly fillers can legally be used in fertilizers and are in fact considerably used therein both as "make-weights" and as "conditioners," or materials introduced to improve the drilling qualities of the goods. The fact that the phosphoric acid in bone and rock are identical in character is probably so well known as to require no detailed consideration in this connection.

The law having required the manufacturer to guarantee the amount of certain valuable ingredients present in any brand he may put upon the market, chemical analysis in employed to verify the guaranties stamped upon the fertilizer sacks. It has, therefore, been deemed desirable in this report to enter the guaranty filed by the manufacturer in the office of the Secretary of Agriculture, in such connection with the analytical results that the two may be compared. An unfortunate practice has grown up among manufacturers of so wording the guaranty that it seems to declare the presence in goods of an amount of valuable constituent ranging from a certain minimum to a much higher maximum; thus, "Potash, 2 to 4 per cent." is a guaranty not infrequently given. In reality, the sole guaranty is for 2 per cent. The guaranteed amounts given for each brand in the following tables, are copied from the guaranties filed by the maker of the goods with the Secretary of Agriculture, the lowest figure given for any constituent being considered to be the amount guaranteed. For compactness and because no essentially important fact is suppressed thereby, the guaranties for soluble and reverted phosphoric acid have not been given separately, but are combined into a single guaranty for available phosphoric acid; in cases where the maker's guaranty does not specifically mention available phosphoric acid, the sum of lowest figures given by him for soluble and reverted phosphoric acid is used. The law of 1879 allowed the maker to express his guaranty for nitrogen either in terms of that element or in terms of the ammonia equivalent thereto; since ammonia is composed of three parts of hydrogen and fourteen parts of nitrogen it is a very simple matter to calculate the amount of one, when the amount of the other is given; the amount of nitrogen multiplied by 1.214 will give the corresponding amount of ammonia, and the amount of ammonia multiplied by 0.824 will give the corresponding amount of nitrogen. In these tables, the expression is in terms of nitrogen. The laws of 1901 and 1909 abolished the alternative and required that the quantity shall be given in terms of nitrogen.

Many manufacturers after complying with the terms of the law, insert additional items in their guaranties, often with the result of misleading or confusing the buyer; the latter will do well to give heed to those items only that are given as the law requires and that are presented in these tables:

A summary of the analyses made this season is presented as follows:

## SUMMARY OF ANALYSES MADE THIS SEASON.

| | Complete. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Number of analyses, | 531 | 140 | 4 | 43 | 32 |
| Moisture, per cent., | 7.87 | 8.26 | 7.35 | 7.98 | 5.96 |
| Phosphoric acid: | | | | | |
| Total, per cent., | 9.71 | 10.68 | 14.63 | 15.85 | 22.14 |
| Available, per cent., | 7.87 | 9.83 | 10.52 | 14.82 | .......... |
| Insoluble, per cent., | 1.60 | .85 | 4.11 | 1.03 | .......... |
| Potash, per cent., | 5.41 | 4.62 | .......... | .......... | .......... |
| Nitrogen, per cent., | 1.61 | .......... | 1.26 | .......... | 3.86 |
| Mechanical analyses of bone: | | | | | |
| Fine, | .......... | .......... | .......... | .......... | 56.00 |
| Coarse, | .......... | .......... | .......... | .......... | 44.00 |
| Commercial valuation,* | 26.44 | 16.52 | 21.63 | 14.25 | 32.50 |
| Average selling price,* | 25.08 | 16.75 | 18.55 | 18.96 | 33.84 |

*Dollars per ton.

"For the purpose of indicating more specifically to the eye, cases deficient in guarantee, an asterisk has been affixed in the analytical tables where the ingredient has been found less in quantity than the manufacturer guaranteed. Too great emphasis should not be placed upon very slight deficiencies, because very slight imperfections in mixing and slight variations in analysis are practically unavoidable. The asterisk has been used therefore, only in cases where the deficiencies amount to 0.2 per cent, or more, except where nitrogen has been guaranteed in amounts not higher than 1.0 per cent., in which case an asterisk has been affixed where the deficiency amounts to 0.1 per cent. or more."

The cases of departure of goods from their guaranteed composition observed this season, including only those cases in which it amounted to two-tenths per cent. or more, were as follows:

### Summary of Instances of Deficiency from Guaranty.

| | Complete fertilizer. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Deficient in four constituents, | 0 | 0 | 0 | 0 | 0 |
| Deficient in three constituents, | 8 | .......... | .......... | .......... | .......... |
| Deficient in two constituents, | 29 | 8 | 1 | 3 | 1 |
| Deficient in one constituent, | 135 | 29 | 1 | 6 | 7 |
| Total number of samples in whcih deficiencies occur, | 172 | 37 | 2 | 9 | 8 |

The cases of deficiency noted during the past eleven seasons in the composition of goods as compared with their guaranties, expressed in percentage of the total number of goods of each class analyzed, are as follows:

### Percentage of deficiency, 1908-1913.

| | Spring, 1908. | Fall, 1908. | Spring, 1909. | Fall, 1909. | Spring, 1910. | Fall, 1910. | Spring, 1911. | Fall, 1911. | Spring, 1912. | Spring, 1913. |
|---|---|---|---|---|---|---|---|---|---|---|
| Complete fertilizers, ........ | 40.0 | †40.0 | 39.5 | 46.3 | 28.9 | 35.9 | 45.1 | 46.9 | 39.0 | 32.3 |
| Dissolved bone, .............. | ‡50.0 | 16.6 | 25.0 | * | 37.5 | 25.0 | 16.6 | 100.00 | 50.0 | 50.0 |
| Rock and potash, .......... | 39.0 | 33.8 | 36.2 | 30.4 | 25.2 | 37.0 | 27.1 | 43.4 | 33.6 | 26.4 |
| Dissolved rock, ............ | 21.2 | 28.5 | 33.3 | 19.5 | 4.3 | 6.3 | 5.9 | 11.9 | 12.5 | 20.9 |
| Ground bone, ................ | 38.0 | 40.0 | 20.8 | 38.4 | 29.17 | 27.6 | 47.8 | 20.0 | 29.2 | 25.0 |
| All classes except miscellaneous, ..................... | 38.8 | 33.3 | 37.6 | 39.6 | 26.5 | 33.5 | 38.7 | 46.0 | 36.0 | 30.4 |

*Only two samples analyzed for which no guarantees are reported.
†Only three samples analyzed.
‡Only four samples analyzed.

A comparison of the average composition of all samples of complete fertilizers for which guaranties are recorded with the average of the corresponding guaranties, for several seasons past, including those of this season, follows:

### Average Composition and Guaranty Compared.

| | Average composition. Per cent. | Average guaranty. Per cent. |
|---|---|---|
| **Spring, 1908.** | | |
| Phosphoric acid: | | |
| Total, ............ | 10.07 | 8.91 |
| Available, ............ | 8.29 | 7.61 |
| Potash, ............ | 5.04 | 4.51 |
| Nitrogen, ............ | 1.64 | 1.59 |
| **Fall, 1908.** | | |
| Phosphoric acid: | | |
| Total, ............ | 10.29 | 9.31 |
| Available, ............ | 8.29 | 7.96 |
| Potash, ............ | 3.24 | 2.94 |
| Nitrogen, ............ | 1.24 | 1.23 |
| **Spring, 1909.** | | |
| Phosphoric acid: | | |
| Total, ............ | 9.83 | 8.98 |
| Available, ............ | 8.07 | 7.66 |
| Potash, ............ | 5.07 | 4.80 |
| Nitrogen, ............ | 1.67 | 1.00 |
| **Fall, 1909.** | | |
| Phosphoric acid: | | |
| Total, ............ | 10.13 | 9.24 |
| Available, ............ | 8.27 | 8.08 |
| Nitrogen, ............ | 1.33 | 1.26 |
| Potash, ............ | 3.41 | 3.12 |

## Average Composition and Guaranty Compared—Continued.

| | Average composition. Per cent. | Average guaranty. Per cent. |
|---|---|---|
| **Spring, 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.80 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Fall, 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.72 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Spring, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.86 | 8.96 |
| Available, | 8.31 | 7.86 |
| Potash, | 4.97 | 4.65 |
| Nitrogen, | 1.53 | 1.54 |
| **Fall, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.59 | 9.09 |
| Available, | 8.20 | 7.87 |
| Potash, | 3.63 | .339 |
| Nitrogen, | 1.12 | 1.19 |
| **Spring, 1912.** | | |
| Phosphoric acid: | | |
| Total, | 9.51 | 8.82 |
| Available, | 8.09 | 7.78 |
| Potash, | 5.34 | 5.05 |
| Nitrogen, | 1.56 | 1.58 |
| **Spring, 1913.** | | |
| Phosphoric acid: | | |
| Total, | 9.71 | 8.92 |
| Available, | 8.11 | 7.37 |
| Potash, | 5.41 | 5.17 |
| Nitrogen, | 1.61 | 1.62 |

It is of interest to note how closely the series of valuations based upon the wholesale price of raw materials in the principal markets during the most important buying season and upon certain average allowances for expenses and profits on the part of the mixer and jobber, coincides with the retail prices later ascertained. A comparison for several seasons past is given below:

## Comparison of Selling Price and Valuation, 1908-1913.

| | Selling price. | Valuation. | Excess of valuation over selling price. |
|---|---|---|---|
| **Complete fertilizers:** | | | |
| 1908, Spring, | 25.69 | 26.23 | .54 |
| Fall, | 22.34 | 23.88 | 1.54 |
| 1909, Spring, | 24.88 | 25.31 | .43 |
| Fall, | 22.07 | 22.25 | .14 |
| 1910, Spring, | 25.26 | 26.63 | 1.43 |
| Fall, | 21.76 | 22.24 | .48 |
| 1911, Spring, | 24.97 | 25.96 | .98 |
| Fall, | 21.73 | 22.33 | .61 |
| 1912, Spring, | 27.64 | 27.24 | —.40 |
| 1913, Spring, | 25.08 | 26.44 | 1.36 |
| **Dissolved bone:** | | | |
| 1908, Spring, | 21.11 | 23.09 | 1.98 |
| Fall, | 22.48 | 26.05 | 3.57 |
| 1909, Spring, | 22.25 | 21.57 | —.68 |
| Fall, | 24.50 | 22.85 | —1.65 |
| 1910, Spring, | 22.17 | 21.47 | —.70 |
| Fall, | 25.80 | 25.70 | —.10 |
| 1911, Spring, | 20.33 | 23.82 | 3.49 |
| Fall, | 24.88 | 21.51 | —3.37 |
| 1912, Spring, | 20.94 | 18.92 | 2.82 |
| 1913, Spring, | 18.55 | 21.63 | 3.08 |
| **Rock and potash:** | | | |
| 1908, Spring, | 16.86 | 16.24 | —.62 |
| Fall, | 16.43 | 16.17 | —.26 |
| 1909, Spring, | 16.98 | 15.94 | 1.04 |
| Fall, | 16.10 | 15.50 | —.60 |
| 1910, Spring, | 17.16 | 16.08 | —1.08 |
| Fall, | 16.38 | 16.34 | —.04 |
| 1911, Spring, | 17.05 | 15.99 | —1.06 |
| Fall, | 16.25 | 16.07 | —.18 |
| 1912, Spring, | 18.17 | 16.26 | —1.91 |
| 1913, Spring, | 16.75 | 16.52 | —.23 |
| **Dissolved rock:** | | | |
| 1908, Spring, | 14.72 | 14.92 | .20 |
| Fall, | 14.31 | 14.86 | .55 |
| 1909, Spring, | 14.76 | 13.62 | —1.14 |
| Fall, | 13.86 | 14.02 | .16 |
| 1910, Spring, | 14.56 | 14.00 | —.56 |
| Fall, | 14.01 | 14.15 | .14 |
| 1911, Spring, | 15.83 | 14.26 | —1.58 |
| Fall, | 14.00 | 13.78 | .22 |
| 1912, Spring, | 14.69 | 14.20 | —.49 |
| 1913, Spring, | 13.96 | 14.25 | .29 |
| **Ground bone:** | | | |
| 1908, Spring, | 29.04 | 28.96 | —.08 |
| Fall, | 28.18 | 17.90 | —1.28 |
| 1909, Spring, | 30.70 | 30.28 | —.42 |
| Fall, | 29.39 | 28.71 | —.68 |
| 1910, Spring, | 30.19 | 30.27 | .08 |
| Fall, | 29.98 | 31.10 | 1.12 |
| 1911, Spring, | 30.93 | 31.47 | .54 |
| Fall, | 31.17 | 31.18 | .01 |
| 1912, Spring, | 32.81 | 33.26 | .45 |
| 1913, Spring, | 33.86 | 32.50 | —1.36 |

## MATERIALS USED IN FERTILIZERS.

The microscopic examination of the nitrogenous fertilizers for leather, hair, and other materials the use of which without notice is prohibited by the Act of May 1, 1909, revealed in no case such quantity of any of these substances as might not fairly be regarded as an accidental trace. No instance has been reported by the sampling agents in which a declaration of the presence of such material has been made. It is, however, a matter of quite general knowledge that substances of this kind are being largely used in fertilizer mixtures; but, in most cases at least, only after such treatment as results in the destruction of the characteristic tissues and, at the same time, wholly or partly in that of the organic compounds originally present.

In conformity with the requirements of the Act of April 23, 1909, many firms dropped from the brand names of goods manufactured by them the word "bone" hitherto forming part of said names. Where such change in name appears, it may be taken as evidence that the phosphoric acid is derived, at least in part, from something else than bone.

## ORGANIZATION OF THE WORK.

In conclusion, I would state that the work of the season has been performed under my direction, as follows:

The nitrogen determinations by W. Thomas, B. S.; those of total phosphoric acid by P. W. Clemmer, B. S.; of insoluble phosphoric acid by H. D. Edmiston and F. N. Crawford, B. S.; of potash by E. S. Erb, M. S.; computations by Miss Verna Bryce, and chlorin, by Charles Kern; and the preparation of samples, care of records, and the detail of the compilation of this bulletin, by G. C. Given, M. S. To these trained and experienced assistants, my acknowledgments are due for loyal and efficient service.

## COMPLETE

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA. | | |
| 554 | High Grade Potato Phosphate, | Wm. H. Yoder, Trexlertown, | 7.65 |
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | | |
| 1112 | †Complete Manure with 10% Potash, | Sam'l H. Wolf, Stevens, | 7.35 |
| 1252 | | E. S. Zehner, Tamaqua, | |
| 199 | †High Grade Potash Compound, | W. V. Shirk, Oakland Mills, | 10.00 |
| 1406 | | Jno. P. Jones Hdwe. Co., Summerville. | |
| 422 | †Special Potash Mixture, | Jno. B. Buckman, Newtown, | 9.18 |
| 159 | | Linesville Coal, Lime and Cement Co., Linesville. | |
| 507 | | Jno. H. Reed, Cressona, | |
| 1867 | Superior Compound, | Paxton Flour and Feed Co., Bowmansdale. | 5.75 |
| 421 | †Top Dresser for Grass, | Jno. B. Buckman, Newtown, | 7.35 |
| 838 | | J. B. Curry Est., Swatara, | |
| 456 | †Bradley's Bay State, | A. W. Sandt, Martins Creek, | 5.30 |
| 1497 | | Chas. McDowell, Mansfield, | |
| 1065 | †Bradley's B. D. Guano, | S. K. Smith & Son, New Bethlehem, | 9.45 |
| 1050 | | A. F. Gault, Bentleyville, | |
| 1121 | | J. S. Cole, Milleville, | |
| 1069 | †Bradley's B. D. Sea Fowl Guano, | Anderson Hdwe. Co., New Bethlehem. | 8.90 |
| 1749 | | Geo. Ifft & Sons, Evans City, | |
| 1614 | †Bradley's Greyhound Fertilizer, | Frank Hagenbach, Danville, R. No. 4. | 6.98 |
| 1039 | | J. G. Leighton, Tunkhannock, | |
| 1825 | | Paxton Flour and Feed Co., Bowmansdale. | |
| 1036 | †Bradley's King Philip, | J. G. Leighton, Tunkhannock, | 12.25 |
| 1824 | | Paxton Flour and Feed Co., Bowmansdale. | |
| 675 | Bradley's Maize Producer, | Wysox Coal and Hay Co., Wysox, | 8.23 |
| 1750 | Bradley's New Method Fertilizer, | Geo. Ifft & Sons, Evans City, | 7.65 |
| 1464 | Bradley's New Rival Fertilizer, | G. R. Andrews, Enon Valley, | 5.90 |
| 1051 | †Bradley's Niagara Phosphate, | A. F. Gault, Bentleyville, | 8.43 |
| 1646 | | Punxsutawney Planing Mill Co., Punxsutawney. | |
| 830 | Bradley's Potato and Vegetable Manure, | Benj. H. Gibson, Hydetown, | 8.95 |
| 2225 | Bradley's Superior Compound, | Otto Braun, Germania, | 11.25 |
| 1353 | Bradley's Tobacco Manure Sulphate, | G. B. Murphy, Red Lion, R. No. 1, | 6.65 |
| 1717 | Bradley's Unicorn, | Deerfield Milling Co., Knoxville, | 8.00 |
| 664 | †Bradley's Weymouth Staple Phosphate, | R. C. King, Ulster, | 7.73 |
| 1122 | | J. S. Cole, Millville, | |
| 1217 | †Canton Chemical Co's CCC Special Compound. | W. B. Winey, Middleburg, | 9.15 |
| 569 | | H. L. Orr, Tyrone, | |
| 1441 | | King Bros., Uniontown, | |
| 354 | †Canton Chemical Baker's Special Wheat, Corn and Grass Mixture. | T. J. Jacobs, Somerfield, | 7.65 |
| 245 | | H. L. Lindner, Milton, | |
| 425 | | Jno. B. Buckman, Newtown, | |
| 1443 | †Canton Chemical Baker's **Standard High** Grade Guano. | King Bros., Uniontown, | 7.65 |
| 1577 | | J. P. Herman, Gordonville, | |
| 655 | †Canton Chemical Eagle Phosphate, | F. L. Kehres & Son, Rebuck, | 9.25 |
| 510 | | Thomas Kramer, Schuylkill Haven, | |
| 1536 | | F. S. Lewis, Quakertown, | |
| 1732 | Canton Chemical Harrow Brand Crop Grower. | Wm. Gates Estate, Kittanning, | 9.10 |
| 424 | †Canton Chemical Potato Manure, | Jno. B. Buckman, Newtown, | 8.18 |
| 244 | | H. L. Lindner, Milton, | |
| 544 | | Geo. F. Hartman, Centre Valley, | |
| 423 | †Canton Chemical Resurgam Guano, | Jno. B. Buckman, Newtown, | 10.03 |
| 246 | | H. L. Lindner, Milton, | |
| 1575 | | J. P. Herman, Gordonville, | |
| 2075 | Crocker's Ammoniated Superphosphate, | J. W. Hartwell, New Wilmington, | 7.03 |
| 464 | Crocker's Century Fertilizer, | Peter Haughenbach, Nazareth, | 5.00 |
| 1470 | Crocker's Colonial Fertilizer, | J. E. Waters, Jamestown, | 6.33 |
| 607 | †Crocker's Complete Manure, | Houck & Henry, New Berlinville, | 10.53 |
| 162 | | Linesville Coal, Lime and Cement Co., Linesville. | |
| 1054 | | Bentleyville Hdw. Co., Bentleyville, | |

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†Composite sample.

# FERTILIZERS.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 5.22 | 4.00 | 2.11 | *7.33 | 8.00 | 9.48 | ...... | *9.48 | 10.00 | 1.61 | 1.50 | 27.75 | 28.00 | 554 |
| 6.89 | 6.00 | .98 | 7.87 | 7.00 | 9.08 | ...... | *9.08 | 10.00 | *2.68 | 3.29 | 33.50 | 35.00<br>33.50 | 1112<br>1252 |
| 8.21 | 8.00 | 1.62 | 9.83 | 9.00 | 10.02 | ...... | 10.02 | 10.00 | 1.57 | 1.65 | 30.85 | ......<br>24.00 | 199<br>1406 |
| 8.84 | 9.00 | 1.46 | 10.30 | 10.00 | 7.54 | ...... | 7.54 | 7.00 | .86 | .82 | 25.70 | 28.00<br>26.00<br>23.00 | 422<br>159<br>507 |
| 8.50 | 8.00 | 1.56 | 10.06 | 9.00 | 4.31 | ...... | 4.31 | 4.00 | 1.83 | 1.65 | 26.65 | 24.00 | 1867 |
| 8.68 | 8.00 | .82 | 9.50 | 9.00 | 5.71 | ...... | 5.71 | 5.00 | *4.66 | 4.94 | 40.69 | 42.00<br>36.00 | 421<br>838 |
| 5.29 | 5.00 | 1.34 | 6.63 | 6.00 | 10.88 | ...... | 10.88 | 10.00 | 1.69 | 1.65 | 29.34 | 29.00<br>28.00 | 456<br>1497 |
| 8.27 | 8.00 | 1.48 | 9.75 | 9.00 | 4.34 | ...... | 4.34 | 4.00 | .93 | .82 | 22.08 | 25.00<br>24.50<br>18.00 | 1050<br>1065<br>1121 |
| 7.89 | 8.00 | 1.99 | 9.88 | 9.00 | 2.19 | ...... | 2.19 | 1.50 | 2.03 | 2.06 | 25.02 | 25.00<br>25.00 | 1069<br>1749 |
| 6.73 | 6.00 | 1.21 | 7.94 | 7.00 | 11.18 | ...... | 11.18 | 10.00 | *3.01 | 3.29 | 36.97 | ......<br>35.00<br>35.00 | 1614<br>1039<br>1825 |
| 8.20 | 8.00 | 1.72 | 9.92 | 9.00 | 2.77 | ...... | 2.77 | 2.00 | 1.15 | 1.03 | 21.63 | 22.00<br>19.00 | 1036<br>1824 |
| *6.86 | 8.00 | 3.55 | 10.41 | 9.00 | 7.07 | ...... | 7.07 | 6.00 | 2.21 | 2.06 | 30.31 | 28.00 | 675 |
| 8.22 | 8.00 | .65 | 8.87 | 9.00 | 2.32 | ...... | 2.32 | 2.00 | .83 | .82 | 19.30 | 22.00 | 1750 |
| 6.69 | 6.00 | 1.42 | 8.11 | 7.00 | 5.92 | ...... | 5.92 | 5.00 | 1.51 | 1.23 | 24.78 | 25.00 | 1464 |
| 6.86 | 7.00 | 1.49 | 8.35 | 8.00 | 1.44 | ...... | 1.44 | 1.00 | .95 | .82 | 17.91 | 21.00<br>20.00 | 1051<br>1646 |
| 7.95 | 8.00 | 1.55 | 9.50 | 9.00 | 5.30 | 1.12 | *6.42 | 7.00 | *2.45 | 3.29 | 31.23 | 38.00 | 830 |
| 8.66 | *9.00 | 1.07 | *9.73 | 10.00 | 6.37 | ...... | *6.37 | 7.00 | 1.23 | .82 | 25.96 | 28.00 | 2225 |
| 3.22 | 3.00 | .35 | *3.57 | 4.00 | .66 | 5.64 | 6.30 | 5.50 | *4.22 | 4.53 | 34.76 | 35.00 | 1353 |
| 8.50 | 8.00 | 1.33 | 9.83 | 9.00 | 2.81 | ...... | 2.81 | 2.00 | 1.75 | 1.65 | 24.56 | 21.00 | 1717 |
| 8.15 | 8.00 | 1.83 | 9.98 | 9.00 | 10.57 | ...... | 10.57 | 10.00 | 1.57 | 1.65 | 31.44 | 30.00<br>26.00 | 664<br>1122 |
| 8.93 | 8.00 | 1.40 | 10.33 | 9.00 | 6.04 | ...... | 6.04 | 6.00 | 2.14 | 2.06 | 30.18 | 28.00<br>30.00<br>30.00 | 1217<br>569<br>1441 |
| 9.00 | 9.00 | 1.56 | 10.56 | 10.00 | 2.37 | ...... | 2.37 | 2.00 | .87 | .82 | 20.60 | 24.00<br>18.00<br>24.00 | 354<br>245<br>425 |
| 8.02 | 8.00 | 1.72 | 9.74 | 9.00 | 3.18 | ...... | 3.18 | 3.00 | 2.16 | 2.06 | 26.49 | 30.00<br>25.00 | 1443<br>1577 |
| 7.70 | 7.00 | 1.33 | 9.03 | 8.00 | 1.34 | ...... | 1.34 | 1.00 | .85 | .82 | 18.16 | 17.50<br>18.00<br>20.00 | 655<br>510<br>1536 |
| 8.16 | 8.00 | 1.40 | 9.56 | 9.00 | 2.25 | ...... | 2.25 | 1.00 | .91 | .82 | 19.78 | 19.00 | 1732 |
| 6.86 | 6.00 | 1.44 | 8.30 | 7.00 | 5.49 | ...... | 5.49 | 5.00 | 1.28 | 1.23 | 23.62 | 26.00<br>22.00<br>23.00 | 424<br>244<br>544 |
| 8.38 | 8.00 | 1.53 | 9.91 | 9.00 | 4.54 | ...... | 4.54 | 4.00 | .87 | .82 | 22.18 | 28.00<br>19.00<br>23.50 | 423<br>246<br>1575 |
| 8.92 | 9.00 | 1.55 | 10.47 | 10.00 | 4.11 | ...... | 4.11 | 2.00 | *1.70 | 2.47 | 26.17 | 28.00 | 2075 |
| 5.30 | 5.00 | 1.14 | 6.44 | 6.00 | 10.02 | ...... | 10.02 | 10.00 | 2.05 | 1.65 | 29.91 | 25.00 | 464 |
| 6.52 | 6.00 | 1.39 | 7.91 | 7.00 | 12.54 | ...... | 12.54 | 10.00 | 2.69 | 2.47 | 36.78 | 32.00 | 1470 |
| 8.09 | 8.00 | 1.34 | 9.43 | 9.00 | 4.19 | ...... | 4.19 | 4.00 | .96 | .82 | 21.93 | 22.00<br>24.00<br>26.00 | 607<br>162<br>1054 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1052 | †Crocker's General Crop Fertilizer, | Bentleyville Hdw. Co., Bentleyville, | 9.53 |
| 813 | | W. P. Rouse & Son, North East, | |
| 1725 | | J. L. Kulp, Indiana, | |
| 2134 | Crocker's Harvest Jewel Fertilizer, | Hall, Kaul & Hyde, St. Marys, | 9.28 |
| 871 | †Crocker's High Grade Potato Fertilizer, | N. R. Yost, Myerstown, | 6.93 |
| 807 | | L. F. Haag, Girard, | |
| 1666 | | Ditz & Mooney Hdw. Co., Clarion, | |
| 182 | Crocker's High Grade Special, | L. F. Haag, Girard, | 8.75 |
| 2155 | Crocker's Nobsque Guano, | O. and W. R. Davis, Kane, | 3.38 |
| 1047 | †Crocker's Potato, Hop and Tobacco Fertilizer. | Bentleyville Hdw. Co., Bentleyville, | 9.05 |
| 1799 | | W. H. Ryland, Cressona, R. D., | |
| 160 | Crocker's Root and Vine, | Linesville Coal, Lime and Cement Co., Linesville. | 10.23 |
| 606 | Crocker's Universal Grain Grower, | Houck & Henry, New Berlinville, | 11.63 |
| 1471 | Crocker's Wheat and Corn Fertilizer, | J. E. Watters, Jamestown, | 9.40 |
| 1751 | †Detrick's Corn and Oats Fertilizer, | Enos Barkey, Evans City, | 11.23 |
| 1831 | | B. F. Horting, Newport, | |
| 5 | †Detrick's Royal Crop Grower, | Jas. Shoacher, Newville, | 10.69 |
| 28 | | J. H. McMurray, McMurray, | |
| 673 | East India Black Hawk Fertilizer, | G. E. Besch, E. Smithfield, | 10.20 |
| 1029 | East India Economizer Phosphate, | B. J. Dougherty, Meshoppen, | 9.05 |
| 1032 | East India Fruit Grower's Friend, | B. J. Dougherty, Meshoppen, | 5.83 |
| 1644 | †East India Hawkeye Fertilizer, | Theo. Gerhart, Gilbert, | 8.78 |
| 1167 | | Harrington & Wilson, Montrose, | |
| 1778 | | A. W. Heller, Wapwallopen, | |
| 1642 | East India Improved Compound, | Theo. Gerhart, Gilbert, | 4.75 |
| 1031 | †East India Pilgrim Fertilizer, | B. J. Dougherty, Meshoppen, | 9.00 |
| 1643 | | Theo. Gerhart, Gilbert, | |
| 674 | East India 10% Vegetable and Potato, | G. E. Beach, E. Smithfield, | 8.60 |
| 1166 | East India Tiger Brand, | Harrington & Wilson, Montrose, | 7.78 |
| 93 | †Great Eastern General, | Wm. J. Johnson, Sinking Spring, | 9.15 |
| 1386 | | J. H. Pricky, Rockhill Furnace, | |
| 92 | †Great Eastern Northern Corn Special, | Wm. J. Johnson, Sinking Spring, | 8.48 |
| 992 | | Julius Long, Danboro, | |
| 89 | †Great Eastern Vegetable Vine and Tobacco Fertilizer. | Wm. J. Johnson, Sinking Spring, | 8.35 |
| 1258 | | Wm. K. Goss, Dallas, | |
| 119 | †Great Eastern High Grade Cabbage Grower. | William Biller, Patton, R. D. No. 1, | 9.53 |
| 91 | | Wm. J. Johnson Sinking Spring, | |
| 993 | | Julius Long, Danboro, | |
| 1341 | Lazaretto Special Ammoniated Compound, | D. F. Breneman, Springvale, | 9.98 |
| 1826 | Maryland O. K. Ammoniated Fertilizer, | Paxton Flour and Feed Co., Bowmansdale. | 8.83 |
| 1866 | Maryland Special Compound for Potatoes and Tobacco. | Paxton Flour and Feed Co., Bowmansdale. | 6.40 |
| 552 | †Michigan Carbon Works General Crop Fertilizer. | Elmer H. Carl, Coopersburg, | 9.33 |
| 827 | | Davis & Hide, Spartansburg, | |
| 756 | †Milsom's Buffalo Guano, | Keil Hdw. Co., Sharpsburg, | 9.83 |
| 136 | | Jas. Jacobs, York Springs, | |
| 1654 | | McCauley, McKay & Co., Brockwayville. | |
| 1793 | Milsom's Corn Fertilizer, | D. R. Stein, Orwigsburg, | 6.75 |
| 1728 | Milsom's Crown Phosphate, | Leechburg Hdw. Co., Leechburg, | 8.33 |
| 1407 | Milsom's Imperial Phosphate, | Grange, A. F. Beck, Sec'y, Hornstown. | 12.66 |
| 2241 | Milsom's Potato and Truck Grower, | R. C. Sharp, Pittsburgh, | 8.25 |
| 1744 | †Milsom's Wheat, Oats and Barley, | Imbrie Bros., Petrolia, | 9.10 |
| 595 | | Morris Reeser, West Leesport, | |
| 1792 | | D. R. Stein, Orwigsburg, | |
| 979 | Moro-Phillips C. and G. Complete Fertilizer. | Jas. W. Butz, Palm, | 10.45 |
| 1788 | †Moro-Phillips Farmer's Potato Mixture, | S. G. Smith, Orwigsburg, | 8.08 |
| 1882 | | E. Kinsloe, Newton Hamilton, | |
| 2243 | Moro-Phillips Special Compound, | Ira Doan, Richboro, | 10.80 |
| 1820 | Moro-Phillips Standard Guano, | W. M. Woods, Huntsdale, | 9.78 |
| 1253 | †Moro-Phillips 10% Potato and Vegetable Manure. | E. S. Zehner, Tamaqua, | 7.50 |
| 1113 | | Eli F. Hornberger, Ephrata, R. D. 3, | |
| 1819 | | W. M. Woods, Huntsdale, | |
| 872 | †North Western Diamond Potash Mixture, | N. R. Yost, Myerstown, | 8.48 |
| 466 | | Jno. Kunkle, Bath, | |
| 1458 | | C. D. Duffee, Oil City, | |
| 1637 | North Western Farmer's Standard, | Chas. Kern, Little Gap, | 6.00 |
| 994 | North Western Garden Manure, | L. E. Wilcox, Danboro, | 5.63 |

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†Composite sample.

LIZERS—Continued

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.62 | 7.00 | 1.28 | 9.90 | 8.00 | 3.87 | ...... | 3.87 | 1.00 | .84 | .82 | 21.60 | 22.00<br>18.50<br>19.00 | 1052<br>818<br>1725 |
| 7.82 | 8.00 | 1.95 | 9.77 | 9.00 | 2.34 | ...... | 2.34 | 2.00 | 1.69 | 1.65 | 23.44 | 26.00 | 2134 |
| 6.45 | 6.00 | 1.50 | 7.95 | 7.00 | 8.00 | 1.65 | *9.65 | 10.00 | *2.93 | 3.29 | 39.94 | 32.00<br>38.50<br>40.00 | 871<br>807<br>1666 |
| 7.93 | 8.00 | 1.44 | 9.37 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | 1.79 | 1.65 | 26.08 | 28.00 | 182 |
| 7.93 | 8.00 | 1.59 | 9.52 | 9.00 | 2.04 | ...... | 2.04 | 2.00 | 1.05 | 1.03 | 20.18 | 27.00 | 2155 |
| 8.36 | 8.00 | 1.62 | 9.98 | 9.00 | 3.86 | ...... | 3.36 | 3.00 | *1.74 | 2.06 | 25.14 | 28.00<br>25.00 | 1047<br>1799 |
| 9.05 | 9.00 | 1.36 | 10.41 | 10.00 | 7.53 | ...... | 7.53 | 7.00 | .84 | .82 | 25.86 | 27.00 | 160 |
| 8.74 | 8.00 | 1.57 | 10.31 | 9.00 | 2.33 | ...... | 2.33 | 2.00 | .86 | .82 | 20.35 | 20.00 | 606 |
| *7.64 | 8.00 | 1.99 | 9.63 | 9.00 | 2.58 | ...... | 2.58 | 1.50 | 2.12 | 2.06 | 25.39 | 23.50 | 1471 |
| 9.05 | 9.00 | 1.53 | 10.58 | 10.00 | 3.44 | ...... | 3.44 | 3.00 | .85 | .82 | 21.76 | 13.06<br>17.75 | 1751<br>1831 |
| 8.45 | 8.00 | 1.72 | 10.17 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | 1.60 | 1.65 | 23.78 | 19.35<br>25.00 | 5<br>28 |
| *8.21 | 9.00 | 3.10 | 11.31 | 10.00 | 2.75 | ...... | 2.75 | 2.00 | 2.91 | 2.47 | 30.28 | 28.00 | 673 |
| 8.05 | 8.00 | 2.19 | 10.24 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | 1.15 | .82 | 21.56 | 20.00 | 1029 |
| 9.30 | 9.00 | 2.06 | 11.36 | 10.00 | 4.40 | 2.89 | 7.29 | 7.00 | .79 | .82 | 26.54 | 26.00 | 1032 |
| 6.90 | 7.00 | 2.41 | 9.31 | 8.00 | 1.62 | ...... | 1.62 | 1.00 | 1.21 | .82 | 19.70 | 18.00<br>22.00<br>18.00 | 1644<br>1167<br>1778 |
| 5.51 | 5.00 | .71 | 6.22 | 6.00 | 11.53 | ...... | 11.53 | 10.00 | 1.60 | 1.65 | 29.43 | 28.00 | 1642 |
| 7.84 | 8.00 | 1.69 | 9.53 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | .99 | .82 | 22.47 | 22.00<br>28.00 | 1031<br>1643 |
| 8.06 | 8.00 | 2.17 | 10.23 | 9.00 | 9.20 | 2.16 | 11.36 | 10.00 | 1.59 | 1.65 | 33.09 | 30.00 | 674 |
| 6.24 | 6.00 | 1.95 | 8.19 | 7.00 | 6.80 | ...... | 6.80 | 5.00 | 1.18 | 1.23 | 24.12 | 26.00 | 1166 |
| 8.85 | 8.00 | 1.12 | 9.97 | 9.00 | 4.46 | ...... | 4.46 | 4.00 | .88 | .82 | 22.59 | 20.00<br>21.00 | 93<br>1386 |
| 9.80 | 9.00 | 1.10 | 10.90 | 10.00 | 2.70 | ...... | 2.70 | 2.00 | 2.69 | 2.47 | 30.00 | 25.50<br>24.50 | 92<br>992 |
| 8.51 | 8.00 | 1.48 | 9.94 | 9.00 | 3.67 | ...... | 3.67 | 3.00 | 2.22 | 2.06 | 27.52 | 24.00<br>25.00 | 189<br>1258 |
| 9.49 | 9.00 | 1.02 | 10.51 | 10.00 | 6.83 | ...... | 6.83 | 7.00 | .83 | .82 | 25.44 | 23.00<br>23.00<br>22.50 | 119<br>91<br>993 |
| 9.33 | 9.00 | 1.70 | 11.03 | 10.00 | 2.83 | ...... | 2.83 | 3.00 | *.80 | 1.03 | 21.31 | 19.00 | 1341 |
| 8.21 | 8.00 | 1.24 | 9.45 | 9.00 | 2.87 | ...... | 2.87 | 2.00 | .84 | .82 | 20.14 | 18.00 | 1826 |
| 8.50 | 8.00 | 1.19 | 9.69 | 9.00 | 9.55 | ...... | *9.55 | 10.00 | 1.55 | 1.65 | 30.46 | 28.00 | 1866 |
| 8.19 | 8.00 | 1.21 | 9.40 | 9.00 | 4.35 | ...... | 4.35 | 4.00 | .73 | .82 | 21.43 | 21.00<br>22.00 | 552<br>827 |
| 8.69 | 8.00 | 1.57 | 10.26 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | .86 | .82 | 22.59 | 25.00<br>21.30<br>22.00 | 756<br>136<br>1654 |
| 9.71 | 9.00 | 1.17 | 10.88 | 10.00 | 2.87 | ...... | 2.87 | 2.00 | 2.54 | 2.47 | 29.41 | 27.00 | 1793 |
| 9.85 | 10.00 | 1.00 | 10.85 | 11.00 | 2.65 | ...... | 2.65 | 2.00 | .46 | ...... | 16.60 | 20.00 | 1728 |
| *11.51 | 12.00 | .88 | *12.39 | 13.00 | 4.43 | ...... | *4.43 | 5.00 | .45 | ...... | 18.50 | ..... | 1407 |
| 7.77 | 8.00 | 2.08 | 9.85 | 9.00 | 10.33 | ...... | 10.33 | 10.00 | 1.65 | 1.65 | 31.40 | 30.00 | 2241 |
| 8.41 | 8.00 | 1.83 | 10.24 | 9.00 | 2.33 | ...... | 2.33 | 2.00 | 1.00 | .82 | 20.82 | 26.00<br>21.00<br>19.00 | 1744<br>595<br>1792 |
| 8.14 | 8.00 | 1.77 | 9.91 | 9.00 | 2.12 | ...... | 2.12 | 2.00 | .86 | .82 | 19.58 | 19.00 | 979 |
| 6.82 | 6.00 | 1.19 | 8.01 | 7.00 | 5.36 | ...... | 5.36 | 5.00 | 1.46 | 1.23 | 23.98 | 26.00<br>25.00 | 1788<br>1882 |
| 8.48 | 8.00 | .75 | 9.23 | 9.00 | 2.96 | ...... | *2.96 | 6.00 | *1.07 | 2.06 | 21.24 | 30.00 | 2243 |
| 8.49 | 8.00 | 1.30 | 9.79 | 9.00 | 4.45 | ...... | 4.45 | 4.00 | .94 | .82 | 22.57 | 18.50 | 1820 |
| 8.64 | 8.00 | 1.12 | 9.76 | 9.00 | 10.02 | ...... | 10.02 | 10.00 | 1.62 | 1.65 | 31.24 | 28.00<br>26.50<br>27.00 | 1253<br>1113<br>1819 |
| 7.85 | 8.00 | 1.60 | 9.45 | 9.00 | 2.00 | 8.87 | 10.87 | 10.00 | 1.66 | 1.65 | 33.88 | 27.00<br>28.50<br>29.50 | 872<br>466<br>1458 |
| 6.18 | 6.00 | 1.66 | 7.84 | 7.00 | 5.88 | ...... | 5.88 | 5.00 | 1.23 | 1.23 | 23.19 | ..... | 1637 |
| 8.51 | 8.00 | 1.21 | 9.72 | 9.00 | 7.06 | .16 | 7.22 | 7.00 | *2.94 | 3.29 | 34.48 | 36.00 | 994 |

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*Constituent falls below guaranty.

## COMPLETE FERTI

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1812 | North Western Earth Warmer Phosphate, | Berger Bros., Pine Grove, | 3.65 |
| 1813 | North Western Puritan Phosphate, | Berger Bros., Pine Grove, | 5.65 |
| 1610 | North Western Shawnee Phosphate, | H. F. Rittenhouse, Berwick, | 8.28 |
| 667 | †Packer's Union Animal Corn Fertilizer, | C. Gerauld, Milan, | 12.06 |
| 120 | | Wm. Biller, Patton, R. D. 1, | |
| 1776 | | Sam Smith, Nescopeck, | |
| 118 | †Packer's Union Potato Manure, | Wm. Biller, Patton, R. D. 1, | 10.55 |
| 1968 | | S. A. Detrick, Milford, | |
| 239 | †Packer's Union Universal Fertilizer, | Solomon Peck, Nittany, R. D. 1, | 6.45 |
| 122 | | Wm. Biller, Patton, R. D. 1, | |
| 666 | | C. Gerauld, Milan, | |
| 551 | Quinnipiac Mohawk Fertilizer, | Elmer H. Carl, Coopersburg, | 7.48 |
| 1786 | Read's Leader Fertilizer, | S. G. Smith, Orwigsburg, | 7.93 |
| 470 | Read's Potash Compound, | Irwin H. Fisher, Nazareth, | 7.48 |
| 1856 | Reese's Ammoniated Phosphate Mixture, | L. C. Martin, Laysville, | 9.78 |
| 991 | Reese's Half and Half, | Benj. Hall, Danboro, | 9.43 |
| 853 | †Reese's Pilgrim Fertilizer, | A. G. Houtz, Myerstown, | 8.53 |
| 1328 | | Milton Newman, Dover, | |
| 840 | Reese's Potato Manure, | J. B. Curry Estate, Swatara, | 9.33 |
| 801 | †Sharpless & Carpenter's Gilt Edge Potato and Tobacco Manure. | H. L. Linden, Milton, | 8.15 |
| 529 | | L. F. Mosser, Mosserville, | |
| 999 | | M. A. Kirby, Falsington, | |
| 75 | Sharpless & Carpenter's No. 2 for Grain and Grass. | L. A. Geiger, Joanna, | 9.05 |
| 998 | †Sharpless & Carpenter's Potato, Corn and Truck Guano. | M. A. Kirby, Falsington, | 8.28 |
| 530 | | L. F. Mosser, Mosserville, | |
| 1155 | | Smith & McKelvey, Blairsville, | |
| 1219 | †Susquehanna Crop Grower, | S. P. Klingle, Middleburg, | 9.33 |
| 266 | | Z. J. Peters, Gernsey, | |
| 1295 | | Percy Harman, Mt. Holly Springs, | |
| 241 | †Susquehanna Potato Phosphate, | The J. N. Getz Co., Lock Haven, | 11.15 |
| 135 | | James Jacobs, York Springs, | |
| 439 | | Jas. Robinson, Honeybrook, | |
| 438 | †Susquehanna Ammoniated Phosphate, | James Robinson, Honeybrook, | 6.73 |
| 95 | | Amos K. Stoltzfus, Elverson, | |
| 691 | | Henry Sunday, East Berlin, | |
| 1 | Susquehanna High Grade Truck Mixture, | Paxton Flour and Feed Co., Bowmansdale. | 6.77 |
| 242 | †Susquehanna Special Potato and Tobacco Manure. | J. N. Getz & Co., Lock Haven, | 7.05 |
| 94 | | Amos K. Stoltzfus, Elverson, | |
| 440 | | James Robinson, Honeybrook, | |
| 12 | Tygert Allen Ten Per Cent. Potato and Vegetable Manure. | J. M. Darrah, Hartsville, | 9.46 |
| 1869 | Tygert Allen's Standard Brand Phosphate, | Paxton Flour and Feed Co., Bowmansdale. | 8.23 |
| 1936 | Tygert Allen's Star Brand Phosphate, | Harvey Detwiler, Chester Springs, | 7.33 |
| 1937 | Tygert Allen's Star Potato Grower, | Harvey Detwiler, Chester Springs, | 8.35 |
| 277 | †Wheeler's Corn Fertilizer, | Daniel Slagen, Logan Mills, | 9.60 |
| 1396 | | S. A. Norris, Shirleysburg, | |
| 88 | †Wheeler's Special Vegetable Manure, | Wm. J. Johnston, Sinking Spring, | 8.15 |
| 1775 | | Sam Smith, Nescopeck, | |
| 895 | Williams' & Clark's Americus Fertilizer, | Simon Carl, Numidia, | 6.80 |
| 1486 | Williams' & Clark's Chesterfield Manure, | J. D. Morris, Covington, | 8.08 |
| 894 | †Williams' & Clark's Elk Brand, | Simon Carl, Numidia, | 7.73 |
| 1980 | | Stewart Weaver, Easton, | |
| 996 | †Williams' & Clark's Good Grower, | Jacob Rush, Plumsteadville, | 6.43 |
| 896 | | Simon Carl, Numidia, | |
| 1641 | | Milton A. Smith, Aquashsashicole, | |
| 997 | Williams' & Clark's Matchless Fertilizer, | Jacob Rush, Plumsteadville, | 10.08 |
| 483 | Williams' & Clark's Panther Phosphate, | N. F. Walker, Athens, | 4.80 |
| 1544 | Williams' & Clark's Prolific Fertilizer, | C. R. Rosenberger, Colmar, | 9.35 |
| 484 | | N. F. Walker, Athens, | |
| 1640 | | Milton A. Smith, Aquashsashicole, | |
| 490 | †Williams' & Clark's Royal Phosphate, | C. E. Drake, Athens, | 10.40 |
| 243 | | H. L. Lindner, Milton, | |
| 1545 | | C. K. Rosenberger, Colmar, | |
| 1487 | Williams' & Clark's Springfall Phosphate, | J. D. Morris, Covington, | 10.70 |
| 519 | †Zell's Economizer Phosphate, | C. H. Kistler, Slatington, | 11.06 |
| 259 | | O. F. Arnold, Dillsburg, | |
| 658 | | Tressler, Schlegle & Co., Red Cross, | |
| 749 | Zell's Hustler Phosphate, | Chas. T. Wills & Co., Parnassus, | 7.08 |
| 258 | †Zell's Special Compound for Potatoes and Vegetables. | O. F. Arnold, Dillsburg, | 8.70 |
| 520 | | C. H. Kistler, Slatington, R. D. 2, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.51 | 6.00 | 1.18 | 7.69 | 7.00 | 10.66 | ...... | 10.66 | 10.00 | 2.42 | 2.47 | 33.44 | 30.00 | 1812 |
| 9.23 | 9.00 | .98 | 10.21 | 10.00 | 7.64 | ...... | 7.64 | 7.00 | .82 | .82 | 25.71 | 24.00 | 1818 |
| 8.26 | 8.00 | 1.64 | 9.90 | 9.00 | 4.50 | ...... | 4.50 | 4.00 | 1.65 | 1.65 | 25.72 | 22.00 | 1610 |
| 9.68 | 9.00 | 1.47 | 11.15 | 10.00 | 2.56 | ...... | 2.56 | 2.00 | 2.52 | 2.47 | 29.00 | 26.00<br>25.00<br>..... | 667<br>120<br>1776 |
| 8.07 | 8.00 | 2.14 | 10.21 | 9.00 | 5.73 | .62 | 6.35 | 6.00 | 2.27 | 2.06 | 30.52 | 27.00<br>32.00 | 118<br>1968 |
| 8.42 | 8.00 | 1.89 | 10.31 | 9.00 | 4.04 | ...... | 4.04 | 4.00 | .81 | .82 | 21.66 | 21.00<br>20.00<br>21.60 | 239<br>122<br>666 |
| 7.72 | 7.00 | 1.45 | 9.17 | 8.00 | 1.18 | ...... | 1.18 | 1.00 | .80 | .82 | 17.83 | 18.00 | 551 |
| 9.04 | 7.00 | 1.41 | 10.45 | 8.00 | 1.32 | ...... | 1.32 | 1.00 | .94 | .82 | 19.96 | 20.00 | 1786 |
| 8.43 | 8.00 | 1.82 | 10.25 | 9.00 | 10.40 | ...... | 10.40 | 10.00 | *1.45 | 1.65 | 31.10 | 27.00 | 470 |
| 9.46 | 9.00 | 1.34 | 10.80 | 10.00 | 3.16 | ...... | 3.16 | 3.00 | *.72 | .82 | 21.09 | 20.00 | 1856 |
| 7.67 | 7.00 | 1.02 | 8.69 | 8.00 | .97 | ...... | .97 | 1.00 | .90 | .82 | 17.82 | 18.00 | 991 |
| 8.21 | 8.00 | 1.31 | 9.52 | 9.00 | 4.33 | ...... | 4.33 | 4.00 | .82 | .82 | 21.48 | 21.00<br>20.10 | 853<br>1328 |
| 10.39 | 9.00 | .96 | 11.35 | 10.00 | 7.94 | ...... | 7.94 | 7.00 | 1.06 | .82 | 28.36 | 21.00 | 840 |
| 8.33 | 8.00 | 1.12 | 9.45 | 9.00 | 7.33 | 2.57 | 9.90 | 10.00 | 1.62 | 1.65 | 31.46 | .....<br>28.00<br>32.00 | 801<br>529<br>999 |
| 7.77 | 7.00 | 1.11 | 8.88 | 8.00 | 1.32 | ...... | 1.32 | 1.00 | .91 | .82 | 18.27 | 17.00 | 75 |
| 6.80 | 6.00 | 1.31 | 8.11 | 7.00 | 5.38 | ...... | 5.38 | 5.00 | 1.26 | 1.23 | 23.17 | 26.00<br>22.00<br>28.00 | 998<br>530<br>1155 |
| 7.41 | 7.00 | 1.28 | 8.69 | 8.00 | 1.59 | ...... | 1.59 | 1.00 | 1.01 | .82 | 18.76 | .....<br>18.00<br>17.00 | 1219<br>266<br>1295 |
| 8.35 | 8.00 | 1.40 | 9.75 | 9.00 | 5.50 | ...... | 5.50 | 5.00 | 1.48 | 1.65 | 26.10 | 27.00<br>25.40<br>25.00 | 241<br>135<br>439 |
| 8.57 | 8.00 | 1.36 | 9.93 | 9.00 | 2.76 | ...... | 2.76 | 2.00 | *1.45 | 1.65 | 23.24 | 24.00<br>20.95<br>21.00 | 438<br>95<br>691 |
| 7.07 | 6.00 | 1.62 | 8.69 | 7.00 | 8.66 | 1.72 | 10.38 | 10.00 | *2.53 | 3.29 | 35.09 | 35.00 | 1 |
| *7.51 | 8.00 | 1.33 | 8.84 | 9.00 | 10.58 | ...... | 10.58 | 10.00 | 1.56 | 1.65 | 30.58 | 33.00<br>27.45<br>30.00 | 242<br>94<br>440 |
| 8.98 | 8.00 | .99 | 9.97 | 9.00 | 8.84 | ...... | *8.84 | 10.00 | 1.47 | 1.65 | 29.67 | 31.00 | 52 |
| 8.04 | 8.00 | 1.50 | 9.54 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.46 | 1.65 | 22.23 | 22.00 | 1869 |
| 8.14 | 8.00 | 1.67 | 9.81 | 9.00 | 3.77 | ...... | 3.77 | 3.00 | 2.04 | 2.06 | 26.68 | 26.00 | 1986 |
| 6.32 | 6.00 | 1.76 | 8.08 | 7.00 | 5.47 | ...... | 5.47 | 5 00 | 1.17 | 1.23 | 23.02 | 24.00 | 1937 |
| 7.95 | 8.00 | 1.44 | 9.39 | 9.00 | 2.43 | ...... | 2.43 | 2.00 | 1.54 | 1.65 | 22.77 | 23.00<br>..... | 237<br>1396 |
| 8.77 | 8.00 | 1.11 | 9.88 | 9.00 | 9.50 | ...... | *9.50 | 10.00 | 1.66 | 1.65 | 31.12 | 28.00<br>..... | 88<br>1775 |
| *7.59 | 8.00 | 1.99 | 9.58 | 9.00 | 10.87 | ...... | 10.87 | 10.00 | 1.56 | 1.65 | 31.24 | 26.00 | 895 |
| 6.64 | 6.00 | 1.78 | 8.42 | 7.00 | 5.53 | ...... | 5.53 | 5.00 | 2.61 | 2.47 | 29.52 | 28.00 | 1486 |
| 8.90 | 8.00 | 1.67 | 10.57 | 9.00 | 4.72 | ...... | 4.72 | 4.00 | 1.01 | .82 | 23.64 | 19.00<br>30.00 | 894<br>1980 |
| 7.30 | 6.00 | 1.53 | 8.83 | 7.00 | 4.35 | ...... | *4.35 | 5.00 | 1.28 | 1.23 | 22.96 | 21.60<br>22.00<br>17.30 | 996<br>896<br>1641 |
| 9.03 | 8.00 | 1.32 | 10.35 | 9.00 | 2.41 | ...... | 2.41 | 2.00 | 1 56 | 1.65 | 23.77 | 21.75 | 997 |
| 5.65 | 5.00 | .75 | 6.40 | 6.00 | 11.62 | ...... | 11.62 | 10.00 | 1.67 | 1.65 | 29.88 | 28.00 | 483 |
| 8.55 | 7.00 | 1.21 | 9.76 | 8.00 | 1.56 | ...... | 1.56 | 1.00 | 1.06 | .82 | 20.07 | 24.00<br>20.00<br>17.00 | 1544<br>484<br>1640 |
| 8.20 | 8.00 | 1.85 | 10.05 | 9.00 | 2.52 | ...... | 2.52 | 2.00 | 1.15 | 1.03 | 21.45 | 21.06<br>18.00<br>28.00 | 490<br>243<br>1545 |
| 8.17 | 8.00 | 2.56 | 10.73 | 9.00 | 3.31 | ...... | 3.31 | 3.00 | 2.20 | 2.06 | 27.39 | 25.00 | 1487 |
| 8.64 | 8.00 | 1.29 | 9.93 | 9.00 | 2.21 | ...... | 2.21 | 2.00 | .98 | .82 | 20.65 | .....<br>17.75<br>18.50 | 519<br>259<br>658 |
| *8.73 | 9.00 | 1.95 | 10.68 | 10.00 | 3.30 | ...... | 3 30 | 3.00 | .94 | .82 | 21.97 | 26.00 | 749 |
| 8.20 | 8.00 | 1.87 | 10.07 | 9.00 | 4.66 | ...... | 4.66 | 4.00 | 2.64 | 2.47 | 30.48 | 26.50<br>..... | 258<br>520 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | | |
| 1931 | American Champion Grain Grower, ....... | Geo. R. Watson, Embreeville, ....... | 11.88 |
| 752 | American Eagle Crop Grower, ............. | Chas. T. Wills & Co., Parnassus, .. | 3.08 |
| 751 | American Reliable Guano, ................. | Chas. T. Wills & Co., Parnassus, .. | 7.78 |
| 1558 | †American Special Compound Guano, .... | Jones Eavenson, Christiana, ........ | 10.38 |
| 1688 | | J. D. Coldsmith, Williamson, ....... | |
| | ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD. | | |
| 878 | Complete Potato, ........................... | M. L. Bachman, Lebanon, ............ | 9.28 |
| 443 | †Wheat, Corn and Oat Special, ........... | Reese H. White, Honeybrook, ..... | 5.88 |
| 855 | | Confluence Lumber Yard, Confluence, | |
| 509 | | Heffner & Luckenbill, Friedensburg, | |
| 611 | †Crop Grower, ............................. | D. N. Zeller, Meyerstown, R. D. 5, | 7.65 |
| 508 | | Seligman & Co., Tamaqua, ......... | |
| 724 | | C. A. Boyer, Roaring Springs, ...... | |
| 1285 | Farmer's Choice, ........................... | J. M. Zook, Belleville, .............. | 6.50 |
| 480 | †High Grade Potato, ....................... | Winabarn Grange, Nichols, N. Y.,.. | 6.18 |
| 804 | | F. G. Kintzel, Richland, ............ | |
| 442 | †Grain Grower, ............................ | Reese H. White, Honeybrook, ....... | 8.98 |
| 857 | | Confluence Lumber Co., Confluence, | |
| 580 | | Chas. Yaeckle, Patton, ............. | |
| 1087 | Lancaster County Tobacco Special, ......... | Sam. H. Snavely, Manheim, ........ | 4.95 |
| 1086 | Pennsylvania Tobacco Grower, ............. | Sam. H. Snavely, Manheim, ........ | 6.53 |
| 1088 | Pennsylvania Tobacco Special, ............ | Sam. H. Snavely, Manheim, ........ | 4.83 |
| 444 | †Royal Ammoniated, ........................ | Reese H. White, Honeybrook, ...... | 7.50 |
| 308 | | A. L. Ickes, Osterburg, ............ | |
| 508 | | Heffner & Luckenbill, Friedensburg, | |
| 947 | †Superior, .................................... | H. C. Beerits & Sons, Somerset, .... | 6.98 |
| 759 | | Henry S. Brown, Cocolamus, ....... | |
| 1144 | | A. Skelly, Ebensburg, ............... | |
| 1202 | †Superphosphate, Bone, Blood and Potash, | M. L. Bachman, Lebanon, .......... | 10.28 |
| 746 | | Chas. T. Wills & Co., Parnassus, ... | |
| 1285 | | Nickles & Stewart, Shippensburg, .. | |
| 782 | †Wheat and Grass Special, ................ | E. H. Buhle, Williamsburg, ........ | 5.78 |
| 927 | | S. W. Fritz, Garrett, ............... | |
| | ATLANTIC FERTILIZER CO., BALTIMORE, MD. | | |
| 948 | Arrow Brand Special, ....................... | Robt. Speicher, Rockwood, .......... | 5.53 |
| 1678 | XX Special Compound for Potatoes, ...... | S. F. Peckman, Williamson, ........ | 5.13 |
| 1696 | Standard Compound, ........................ | Lizzcie George, Tioga, .............. | 5.10 |
| | BALTIMORE FERTILIZER CO., BALTIMORE, MD. | | |
| 228 | Honest Potato Grower, ..................... | H. E. Van Orner, Thompsontown, .. | 6.95 |
| 229 | Honest Success, ............................. | H. E. Van Orner, Thompsontown, .. | 5.70 |
| 625 | Honest Tankage, Rock and Potash, ...... | I. M. Leightner, Gettysburg, ...... | 6.38 |
| | BAUGH & SONS COMPANY, PHILADELPHIA, PA. | | |
| 1888 | Baugh's Wheat Fertilizer for Wheat and Grass. | Western Penitentiary, Bellefonte, .. | 7.83 |
| 1803 | Baugh's High Grade Potato Grower, ....... | C. G. Updegrove, Sacramento, ...... | 5.33 |
| 1583 | The Wrapper Leaf Brand. A Special Manure for Seed Leaf Tobacco. | J. H. Umble & Bro., Bird-in-Hand,.. | 5.10 |
| 987 | †Baugh,s Balanced Plant Food. A Superior Fertilizer for General Use. | Wm. P. Hay, Somerset, R. D., ..... | 9.55 |
| 1084 | | Jas. G. Kauffman, Dauberville, .... | |
| 1837 | †Baugh's Animal Base and Potash Compound for All Crops. | Brillinger & Swartz, Emigsville, .... | 8.15 |
| 1582 | | J. H. Umble & Bro., Bird-in-Hand,.. | |
| 216 | †Baugh's Excelsior Guano, ................ | Wisenhaupt & Frazer, Port Royal,.. | 7.88 |
| 146 | | Cook & Co., Dillsburg, .............. | |
| 458 | | John F. Steir, Johnsonville, ...... ... | |
| 1018 | †Baugh's Potato and Truck Special for all Truck Crops. | Hobensack Bros., Ivyland, .......... | 8.06 |
| 449 | | Jno. F. Steir, Johnsonville, .. ....... | |
| 1174 | | M. M. Jacklin, Wilawana, .......... | |
| 437 | †Baugh's General Crop Grower for all Crops. | Ed. Brinton & Sons, West Chester,.. | 7.60 |
| 264 | | Grover C. Myers, Idaville, .......... | |
| 459 | | Jno. F. Steir, Johnsonville, .......... | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.74 | 8.00 | 2.45 | 12.19 | 9.00 | 3.76 | ...... | *3.76 | 4.00 | .81 | .82 | 23.00 | 21.00 | 1931 |
| 8.57 | 8.00 | 2.26 | 10.83 | 9.00 | 2.26 | .15 | 2.41 | 2.00 | 1.61 | 1.65 | 24.03 | 27.00 | 752 |
| 8.93 | 8.00 | 1.16 | 10.09 | 9.00 | 1.33 | ...... | 1.33 | 1.00 | .96 | .82 | 19.80 | 25.00 | 751 |
| 7.64 | 7.00 | 2.21 | 9.85 | 8.00 | 3.36 | ...... | 3.36 | 3.00 | .64 | .41 | 19.64 | 17.00<br>16.00 | 1558<br>1688 |
| 6.23 | 6.00 | .88 | 7.11 | 6.50 | 11.29 | ...... | 11.29 | 10.00 | *3.08 | 3.29 | 36.60 | 33.00 | 878 |
| *6.57 | 7.00 | 1.41 | 7.98 | 7.50 | 1.41 | ...... | 1.41 | 1.00 | .86 | .82 | 17.06 | 17.00<br>19.00<br>18.00 | 443<br>856<br>509 |
| 8.07 | 8.00 | .73 | 8.80 | 8.50 | 2.46 | ...... | 2.46 | 2.00 | .86 | .82 | 19.84 | 19.00<br>22.00<br>18.00 | 611<br>563<br>724 |
| 9.19 | 9.00 | 1.52 | 10.71 | 9.50 | 3.59 | ...... | 3.59 | 3.00 | .81 | .82 | 21.82 | 19.50 | 1235 |
| *7.71 | 8.00 | 1.33 | 9.04 | 8.50 | 10.21 | ...... | 10.21 | 10.00 | 1.76 | 1.65 | 31.29 | 23.85<br>27.50 | 480<br>864 |
| 7.89 | 8.00 | 1.40 | 9.29 | 8.50 | 2.35 | ...... | 2.35 | 2.00 | 1.61 | 1.65 | 22.83 | 20.00<br>24.00<br>22.00 | 442<br>857<br>586 |
| 4.46 | 4.50 | 2.43 | 6.89 | 5.00 | 1.60 | 9.71 | 11.31 | 10.50 | *5.58 | 6.17 | 49.57 | 45.50 | 1987 |
| 7.82 | 8.00 | 1.24 | 9.06 | 8.50 | 5.33 | .36 | *5.69 | 6.00 | *1.80 | 2.47 | 27.07 | 28.50 | 1986 |
| 8.62 | 8.00 | 1.81 | 10.43 | 8.50 | 1.20 | 5.05 | *6.25 | 7.00 | *3.70 | 4.11 | 38.54 | 37.00 | 1988 |
| 7.82 | 8.00 | 1.52 | 9.34 | 8.50 | 4.11 | ...... | 4.11 | 4.00 | .84 | .82 | 21.19 | 19.00<br>.....<br>21.00 | 444<br>398<br>508 |
| 8.04 | 8.00 | .64 | 8.68 | 8.50 | 7.09 | ...... | 7.09 | 7.00 | .84 | .82 | 24.04 | 25.00<br>22.00<br>22.00 | 947<br>759<br>1144 |
| 8.47 | 8.00 | 1.77 | 10.24 | 8.50 | 7.01 | ...... | 7.01 | 7.00 | *3.86 | 4.11 | 38.61 | 35.00<br>42.00<br>37.00 | 1262<br>746<br>1285 |
| 6.98 | 7.00 | .83 | 7.81 | 7.50 | 5.63 | ...... | 5.63 | 5.00 | 1.01 | .82 | 22.25 | 19.00<br>22.00 | 732<br>927 |
| 7.86 | 8.00 | 1.06 | 8.92 | 9.00 | 4.39 | ...... | 4.39 | 4.00 | .99 | .82 | 21.96 | 18.50 | 948 |
| 7.87 | 8.00 | 1.25 | 9.12 | 9.00 | 11.01 | ...... | 11.01 | 10.00 | 1.58 | 1.65 | 31.52 | 27.00 | 678 |
| *7.51 | 8.00 | .92 | *8.43 | 9.00 | 2.41 | ...... | 2.41 | 2.00 | 1.70 | 1.65 | 22.74 | 27.00 | 1696 |
| 7.11 | 6.00 | 2.55 | 9.66 | 7.00 | 9.54 | ...... | 9.54 | 8.00 | 1.55 | 1.60 | 29.68 | 26.00 | 228 |
| 7.16 | 7.00 | 1.93 | 9.09 | 8.00 | 4.68 | ...... | 4.68 | 4.00 | .90 | .80 | 21.54 | 19.00 | 229 |
| 7.89 | 7.00 | .51 | 8.40 | 8.00 | 1.92 | ...... | 1.92 | 1.00 | .78 | .20 | 18.30 | 16.00 | 625 |
| 7.98 | 8.00 | 1.38 | 9.36 | ...... | 2.97 | ...... | 2.97 | 2.00 | 1.61 | 1.65 | 23.49 | ..... | 1888 |
| 9.10 | 8.00 | 1.95 | 11.05 | ...... | 9.60 | .73 | 10.33 | 10.00 | 3.63 | 3.30 | 42.01 | 32.50 | 1803 |
| 4.65 | 3.50 | 1.85 | 6.50 | ...... | 6.37 | ...... | 6.37 | 5.00 | 3.35 | 3.30 | 31.78 | 28.00 | 1583 |
| 11.67 | 10.50 | 1.34 | 13.01 | ...... | 5.64 | ...... | *5.64 | 7.00 | 1.70 | 1.65 | 30.44 | 28.00<br>26.00 | 937<br>1084 |
| 8.70 | 8.00 | 2.07 | 10.77 | ...... | 2.95 | ...... | 2.95 | 2.00 | 1.58 | 1.65 | 24.57 | 21.00<br>22.00 | 1337<br>1582 |
| 8.69 | 8.00 | 1.19 | 9.88 | ...... | 4.39 | ...... | 4.39 | 4.00 | 1.01 | .82 | 22.90 | 19.65<br>18.25<br>25.00 | 216<br>146<br>458 |
| 8.28 | 7.00 | 1.28 | 9.56 | ...... | 7.08 | ...... | 7.08 | 7.00 | 2.89 | 2.88 | 33.94 | 34.10<br>35.00<br>32.10 | 1018<br>449<br>1174 |
| 8.94 | 8.00 | 2.42 | 11.36 | ...... | 1.86 | ...... | 1.86 | 1.00 | 1.08 | .82 | 21.58 | 21.00<br>16.50<br>..... | 437<br>264<br>459 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1016 | †Baugh's Peruvian Guano Substitute for Potatoes and all Vegetables. | Hobensack Bros., Ivyland, ......... | 6.25 |
| 550 | | S. K. Moore, Coopersburg, .......... | |
| 1175 | | M. M. Jacklin, Wilawana, ......... | |
| 1898 | †Baugh's Peninsula Grain Producer, .... | A. M. Rishel, Bellefonte, .......... | 8.80 |
| 148 | | Cook & Co., Dillsburg, .............. | |
| 1958 | | Olive Mibeil, Bushkill, .............. | |
| 224 | †Baugh's Grand Rapids High Grade Guano. | John D. Miller, Richfield, ............ | 5.88 |
| 1358 | | C. I. Saylor, Felton, ................ | |
| 262 | †Baugh's Ammoniated Soluble Alkaline, | Grover C. Meyers, Idaville, ........ | 7.53 |
| 79 | | L. A. Geiger, Joanna, .............. | |
| 1279 | | S. E. Shank, Newville, ............. | |
| 147 | †Baugh's Complete Animal Base Fertilizer. | Cook & Co., Dillsburg, ............ | 7.83 |
| 76 | | L. A. Geiger, Joanna, .............. | |
| 198 | | Frank Sieber, Mifflintown, .......... | |
| 263 | †Baugh's Special Potato Manure, ........ | Grover C. Meyers, Idaville, ......... | 6.26 |
| 77 | | L. A. Geiger, Joanna, .............. | |
| 435 | | Ed. Brinton & Sons, W. Chester, ... | |
| | W. C. BECKERT, NORTH SIDE, PITTSBURGH, PA. | | |
| 324 | Beckert's Odorless Lawn and Garden Fertilizer. | W. C. Beckert, Pittsburgh, .......... | 6.00 |
| | THE BERG COMPANY, PHILADELPHIA, PA. | | |
| 1997 | D. K. Dee Kay Guano, ...................... | W. C. Herr, Strasburg, ............. | 4.73 |
| 407 | †Berg's High Grade Potato Manure, ...... | B. R. Watson, Oxford, .............. | 7.65 |
| 1247 | | Wm. T. Zeigler, Cressona, .......... | |
| 984 | †Berg's Ya Goot Brand, .................. | Jas. Brady, Lansdale, .............. | 8.73 |
| 1117 | | A. B. Graff, New Holland, ......... | |
| 1933 | Berg's Pure Dissolved Bone and Potash for Wheat and Grass. | Geo. R. Watson, Embreeville, ...... | 4.28 |
| 406 | †Berg's S. B. M. Standard Bone Manure, | B. R. Watson, Oxford, .............. | 8.73 |
| 1248 | | Wm. T. Zeigler, Cressona, .......... | |
| 409 | †Berg's Special Bone Manure, ............ | B. R. Watson, Oxford, .............. | 7.58 |
| 1550 | | A. B. Graff, New Holland, ......... | |
| 1984 | Berg's Tobacco Manure, ..................... | A. B. Graff, New Holland, ......... | 9.98 |
| | BERGER BROS., EASTON, PA. | | |
| 1626 | Farmers' Favorite Superphosphate, ......... | John Osterstock, Easton, ............. | 16.13 |
| | D. BLOCKER & CO., BALTIMORE, MD. | | |
| 628 | Ammoniated Soluble Phosphate, ........... | J. H. Stevens' Barn, Gettysburg, .. | 8.00 |
| | J. W. BARWELL, WAUKEGAN, ILL. | | |
| 739 | Barwell's Plant Grower and Land Renovater. | H. J. Klinger & Co., Butler, ....... | 7.50 |
| | BOWKER FERTILIZER CO., NEW YORK CITY. | | |
| 318 | †Bowker's Corn and Grain Grower, .... | C. S. Hunter & Co., Washington, .. | 10.30 |
| 205 | | Jno. Sieber, Mifflintown, ............ | |
| 344 | | L. S. Harris, Harrisburg, ........... | |
| 748 | Bowker's Farm and Garden Phosphate, .... | Chas. T. Willis & Co., Parnassus, .. | 8.68 |
| 1376 | Bowker's Ideal Potash Compound, ........ | H. W. Rehmeyer, Turnpike, ........ | 10.45 |
| 345 | †Bowker's Market Garden Fertilizer, .... | L. S. Harris, Harrisburg, .......... | 13.13 |
| 316 | | C. S. Hunter Co., Washington, ..... | |
| 1104 | | Wm. Gerhart, Reinholds, ............ | |
| 348 | †Bowker's Potash Fertilizer, ............... | S. A. Fishburn, Penbrook, ........... | 8.38 |
| 1402 | | B. F. Fink, Huntingdon, ........... | |
| 452 | †Bowker's Potash or Staple Phosphate, .. | Isaac Snyder, Bangor, ............... | 9.85 |
| 670 | | Walter Pierce, E. Smithfield, ....... | |
| 750 | †Bowker's Potato and Vegetable Fertilizer. | Chas. T. Wills & Co., Parnassus, ... | 10.05 |
| 727 | | H. L. Stultz, Hollidaysburg, ....... | |
| 1403 | | B. F. Fink, Huntingdon, ........... | |
| 1740 | †Stockbridge's Special Complete Manure for Potatoes and Vegetables. | Alex Strittmatter, Bradley's Junc., | 7.38 |
| 1261 | | H. B. Harned, Wyoming, ........... | |
| 1911 | | J. C. Mattern, Port Matilda, ....... | |
| 1912 | Stockbridge's Special Complete Manure for Corn and All Grain Crops. | J. C. Mattern, Port Matilda, ....... | 1.23 |
| 451 | †Bowker's Special Crop Grower, ......... | Isaac Snyder, Bangor, ............... | 7.45 |
| 1378 | | H. W. Rehmeyer, Turnpike, ....... | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.94 | 6.00 | 1.45 | 8.39 | ...... | 5.86 | 1.81 | 7.67 | 7.00 | 4.10 | 4.1. | 39.12 | 38.00<br>35.00<br>35.60 | 1016<br>550<br>1175 |
| 8.95 | 8.00 | 1.66 | 10.61 | ...... | 3.32 | ...... | 3.32 | 2.00 | .98 | 1.00 | 22.26 | .....<br>18.25<br>22.00 | 1898<br>148<br>1950 |
| 8.35 | 8.00 | 1.00 | 9.85 | ...... | 3.51 | ...... | 3.51 | 3.00 | 2.43 | 2.47 | 28.15 | 25.50<br>24.00 | 224<br>1358 |
| 8.33 | 8.00 | 1.19 | 9.52 | ...... | 2.48 | ...... | 2.48 | 2.00 | .41 | .41 | 15.22 | 15.00<br>17.00<br>15.00 | 262<br>79<br>1279 |
| 8.76 | 8.00 | 2.05 | 10.81 | ...... | 4.81 | ...... | 4.81 | 5.00 | 1.50 | 1.65 | 26.05 | 22.75<br>23.00<br>..... | 147<br>76<br>198 |
| 5.54 | 5.00 | 2.51 | 7.75 | ...... | 8.66 | 1.72 | 10.38 | 10.00 | 1.46 | 1.65 | 28.59 | 24.00<br>25.00<br>32.00 | 263<br>77<br>435 |
| 6.26 | ...... | 15.25 | *21.51 | 22.00 | 2.16 | ...... | 2.16 | 2.00 | 1.73 | 1.65 | 28.27 | 43.00 | 324 |
| *7.08 | 7.50 | 2.81 | 9.89 | 10.00 | .66 | .38 | 1.04 | .50 | 2.35 | 2.47 | 24.87 | 25.00 | 1997 |
| 8.62 | 8.00 | 1.54 | *10.16 | 11.00 | 9.78 | ...... | *9.78 | 10.00 | *2.50 | 3.00 | 35.31 | 35.00<br>..... | 407<br>1247 |
| 7.96 | 8.00 | 1.43 | *9.39 | 11.00 | 3.87 | ...... | 3.87 | 4.00 | 1.01 | .82 | 21.69 | 22.00<br>19.00 | 984<br>1117 |
| *6.51 | 9.00 | 4.80 | *11.31 | 12.00 | 5.38 | ...... | 5.38 | 5.00 | *1.69 | 2.00 | 26.60 | 28.00 | 1933 |
| 10.29 | 8.00 | 2.73 | 13.02 | 11.00 | 5.06 | ...... | *5.06 | 6.00 | *1.58 | 3.00 | 28.68 | 30.00<br>..... | 406<br>1248 |
| 8.57 | 7.00 | 2.84 | 11.41 | 11.00 | 3.31 | ...... | 3.31 | 3.00 | *1.10 | 2.00 | 22.88 | 25.00<br>24.00 | 409<br>1550 |
| 8.78 | 8.00 | 1.91 | *10.79 | 11.00 | 4.14 | ...... | *4.14 | 6.00 | *1.77 | 3.00 | 26.61 | 29.00 | 1984 |
| 7.10 | 7.00 | 1.02 | 8.12 | ...... | 3.18 | ...... | 3.18 | 2.50 | 1.02 | .82 | 19.95 | 18.00 | 1626 |
| 11.48 | 9.00 | .36 | 11.84 | 10.00 | 2.63 | ...... | 2.63 | 1.50 | .41 | .41 | 17.34 | 17.00 | 628 |
| *4.66 | 5.25 | 4.43 | *9.09 | 10.50 | 1.46 | 4.24 | *5.70 | 6.00 | 4.94 | 5.00 | 40.68 | 60.00 | 739 |
| 8.57 | 8.00 | 1.53 | 10.10 | 9.00 | 3.74 | ...... | *3.74 | 4.00 | .77 | .82 | 21.12 | 25.00<br>19.00<br>..... | 318<br>205<br>344 |
| *7.46 | 8.00 | 2.65 | 10.11 | 9.00 | 2.91 | ...... | 2.91 | 2.00 | 1.65 | 1.65 | 23.76 | 26.00 | 748 |
| 10.09 | 10.00 | .96 | 11.05 | 11.00 | 5.44 | ...... | *5.44 | 6.00 | 1.11 | 1.23 | 25.74 | 23.00 | 1376 |
| 6.54 | 6.00 | 1.06 | 7.60 | 7.00 | 9.59 | ...... | *9.59 | 10.00 | 2.33 | 2.47 | 32.10 | .....<br>36.00<br>..... | 345<br>316<br>1104 |
| 6.38 | 6.00 | 1.33 | 7.71 | 7.00 | 2.46 | ...... | 2.46 | 2.00 | *.72 | .82 | 17.76 | 17.50<br>23.00 | 348<br>1402 |
| 8.68 | 8.00 | 1.72 | 10.40 | 9.00 | 2.77 | ...... | *2.77 | 3.00 | .91 | .8 | 21.01 | .....<br>25.00 | 452<br>670 |
| 8.81 | 8.00 | 1.50 | 10.31 | 9.00 | 4.35 | ...... | 4.35 | 4.00 | *2.21 | 2.47 | 28.57 | 32.00<br>30.00<br>36.00 | 750<br>727<br>1408 |
| 6.74 | 6.00 | 1.19 | 7.93 | 7.00 | 10.50 | ...... | 10.50 | 10.00 | 3.60 | 3.29 | 39.00 | 33.00<br>.....<br>..... | 1740<br>1261<br>1911 |
| 10.93 | 10.00 | 1.08 | 12.01 | 11.00 | 7.53 | ...... | 7.53 | 7.00 | 3.14 | 3.2 | 38.14 | ..... | 1912 |
| 8.71 | 8.00 | 1.50 | 10.21 | 9.00 | 9.76 | ...... | *9.76 | 10.00 | 1.62 | 1.65 | 31.24 | .....<br>26.00 | 451<br>1378 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 592 | †Bowker's Sure Crop Phosphate, | Hamburg Supply House, Hamburg, | 11.18 |
| 349 | | S. A. Fishburn, Penbrook, | |
| 730 | | H. L. Stultz, Hollidaysburg, | |
| 25 | Bowker's Ammoniated Food for Flowers, | W. C. Beckert, Pittsburgh, North Side. | 4.75 |
| | BRADLEY & GREEN FERTILIZER CO., PHILADELPHIA, PA. | | |
| 1022 | Extra High Grade Potato Guano, | Bradley & Green Ftz. Co., Phila., | 7.60 |
| 1021 | High Grade Potato Guana, | Bradley & Green Ftz. Co., Phila., | 6.53 |
| | CAMBRIA FERTILIZER CO., JOHNSTOWN, PA. | | |
| 931 | B. and B. Phosphate, | Claude Davis, Windber, | 10.18 |
| 930 | Corn and Potato Manure, | Claude Davis, Windber, | 5.89 |
| 929 | Standard Phosphate, | Claude Davis, Windber, | 4.70 |
| | CENTRAL CHEMICAL CO., HAGERSTOWN, MD. THOMAS FERTZ. WORKS. | | |
| 1307 | C. C. C. Farmer's Century Brand, | E. W. Rupp, Shiremanstown, | 7.88 |
| 1822 | C. C. C. Atlas Keystone, | H. R. Miller, Huntsdale, | 6.88 |
| 1684 | C. C. C. Golden Sheaf, | J. A. Witherspoon, Mercersburg, | 8.85 |
| 1137 | C. C. C. Crescent Jewel, | W. F. Slagle, Bloomsburg, | 7.63 |
| 1141 | C. C. C. Fish Guano, | W. F. Slagle, Bloomsburg, | 6.25 |
| 853 | C. C. C. Fish, Bone and Potash, | M. G. Adams, Paxinos, | 8.40 |
| 1306 | †C. C. C. Superior Planter's Mixture, | E. W. Rupp, Shiremanstown, | 6.68 |
| 1821 | †C. C. C. Empire, | H. R. Miller, Huntsdale, | 7.60 |
| 1140 | | W. F. Slagle, Bloomsburg, | |
| 532 | | Oliver De Long, Sayersville, | |
| 1685 | | J. A. Witherspoon, Mercersburg, | |
| 533 | Excelsior Pheonix, | Oliver De Long, Sayersville, | 6.38 |
| 6 | C. C. C. Farm Favorite, | H. A. Snyder, Fishers Ferry, | 6.01 |
| 41 | C. C. C. Special, | Morris T. Wood, Downingtown, | 8.80 |
| 3 | C. C. C. Valley Mixture, | E. J. Otto, Herndon, | 8.88 |
| | CHESAPEAKE CHEMICAL CO., THE, BALTIMORE, MD. | | |
| 589 | C. C. Co's English Mixture, | Wm. Biller, Patton, | 6.95 |
| 718 | C. C. Co's Farmer's Favorite, | Wm. Biller, Patton, | 5.90 |
| 711 | C. C. Co's Triumph Guano, | Wm. Biller, Patton, | 7.20 |
| | COE MORTIMER CO., THE, NEW YORK. | | |
| 1982 | E. Frank Coe's Reliable Crop Grower, | J. W. Shoewalter, New Holland, | 8.80 |
| 2007 | E. Frank Coe's Penna. Tobacco Special, | Newton S. Sprecher, Ephrata, | 4.80 |
| 1611 | E. Frank Coe's Gold Brand Excelsior Guano. | Adolph Boettinger, Danville, | 8.68 |
| 475 | E. Frank Coe's Extra Special Potato Fertilizer and Fruit Grower. | C. J. Easterbrook & Son, Rummerfield. | 7.58 |
| 494 | †E. Frank Coe's Penna. No. 1 Grain Special for Wheat, Rye and Oats. | Floyd Campbell, Athens, | 8.98 |
| 65 | | W. W. Frick & Co., Kutztown, | |
| 1688 | | Milton A. Buck, Kunkletown, | |
| 398 | †E. Frank Coe's Columbia Corn and Potate Fertilizer. | I. W. Scott Co., Pittsburgh, | 10.25 |
| 66 | | W. W. Frick & Co., Kutztown, | |
| 495 | | Floyd Campbell, Athens, | |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 1699 | Columbia Fish, Phosphate and Potash, | E. D. Davis, Middleburg Center, | 3.58 |
| 1712 | Bully Good Guano, | Owlett & Twilliger, Galeton, | 1.78 |
| 488 | Columbia Special Potato Guano, | Henry & Bressler, Athens, | 4.68 |
| 1656 | †Columbia Special Potato Formula, | Wm. H. Brinton, Fallscreek, | 7.23 |
| 1500 | | Jno. Kelsa, Mansfield, | |
| 1960 | | John Cook, Bushkill, | |
| 1711 | †Columbia General Crop Manure, | Owlet & Twilliger, Galeton, | 12.20 |
| 1961 | | John Cook, Bushkill, | |
| 50 | Columbia Grain Special Fertilizer, | Thomas Prosinger, Reeders, | 7.54 |
| | HENRY COPE & CO., LINCOLN UNIVERSITY, PA. | | |
| 1946 | Henry Cope & Co's Ammoniated Phosphate, | Lyburn Whitaker, Oxford, | 13.18 |
| 1542 | Potato and Corn Phosphate, | Thos. Haines & Co., Malvern, | 11.63 |

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†Composite sample.

LIZERS—Continued

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.25 | 9.00 | 1.40 | 10.65 | 10.00 | 2.27 | ...... | 2.27 | 2.00 | .86 | .82 | 20.67 | 20.00<br>19.50<br>20.00 | 592<br>349<br>730 |
| 6.94 | ...... | 1.49 | 8.43 | ...... | .80 | 3.14 | 3.94 | 2.00 | 3.11 | 2.47 | 31.14 | ..... | 25 |
| 7.00 | 6.00 | 1.20 | 8.20 | 7.00 | 8.93 | .14 | •9.08 | 10.00 | •2.89 | 3.29 | 34.66 | 33.00 | 1022 |
| 8.51 | 8.00 | 1.52 | 10.03 | 9.00 | 10.81 | ...... | 10.81 | 10.00 | 1.71 | 1.65 | 32.61 | 25.00 | 1021 |
| 6.49 | 6.50 | 2.04 | 8.53 | 8.00 | 2.79 | ...... | 2.79 | 2.00 | •.86 | 1.00 | 18.75 | 22.00 | 981 |
| 7.47 | 6.00 | 1.86 | 9.33 | 7.00 | 9.03 | ...... | 9.03 | 8.00 | 1.52 | 1.50 | 29.01 | 22.00 | 980 |
| 6.41 | 6.00 | 2.27 | 8.68 | 7.00 | 5.40 | ...... | 5.40 | 3.00 | 1.76 | 1.50 | 26.54 | 25.00 | 979 |
| 8.04 | 8.00 | 8.28 | 8.32 | ...... | 2.64 | ...... | 2.64 | 2.00 | .81 | .82 | 19.08 | 18.00 | 1307 |
| 8.34 | 8.00 | .28 | 8.62 | ...... | 4.96 | ...... | 4.96 | 4.00 | •.57 | .82 | 20.60 | 20.00 | 1322 |
| •7.26 | 8.00 | .50 | 7.76 | ...... | 1.38 | ...... | 1.38 | 1.00 | 1.15 | .82 | 18.70 | 16.00 | 1084 |
| 9.22 | 9.00 | .37 | 9.59 | ...... | 3.89 | ...... | 3.89 | 3.00 | .81 | .82 | 21.68 | 21.00 | 1187 |
| •7.75 | 8.00 | .45 | 8.20 | ...... | 4.62 | ...... | 4.62 | 4.00 | .86 | .82 | 21.09 | 22.00 | 1141 |
| 7.19 | 7.00 | .35 | 7.54 | ...... | 3.43 | ...... | 3.43 | 3.00 | •.84 | 1.04 | 19.21 | 21.00 | 868 |
| 8.08 | 8.00 | .31 | 8.39 | ...... | 6.23 | ...... | 6.23 | 6.00 | .84 | .82 | 23.06 | 21.00 | 1806 |
| 8.39 | 8.00 | .38 | 8.77 | ... | 8.00 | 2.29 | 10.29 | 10.00 | 1.68 | 1.65 | 31.96 | 21.00<br>22.00<br>.....<br>30.00 | 1821<br>1140<br>582<br>1685 |
| 8.16 | 8.00 | .28 | 8.44 | ...... | 4.59 | ...... | 4.59 | 4.00 | 1.50 | 1.65 | 24.39 | ..... | 533 |
| 9.56 | 8.00 | .51 | 10.07 | 9.00 | 3.16 | ...... | 3.16 | 3.00 | .59 | .41 | 20.34 | ..... | 6 |
| 8.51 | 8.00 | .58 | 9.09 | ...... | 3.60 | 4.31 | 7.91 | 8.00 | 1.60 | 1.65 | 29.78 | 22.50 | 41 |
| 8.51 | 8.00 | .61 | 9.12 | ...... | 2.19 | ...... | 2.19 | 2.00 | •1.27 | 1.65 | 21.31 | 21.50 | 8 |
| 7.81 | 8.00 | 1.09 | 8.90 | 9.00 | 6.21 | ...... | 6.21 | 5.00 | .95 | 1.00 | 23.54 | 20.00 | 589 |
| 7.04 | 7.00 | 1.12 | 8.16 | 8.00 | 4.76 | ...... | 4.76 | 4.00 | .82 | .82 | 20.88 | 18.00 | 718 |
| •7.03 | 8.00 | 2.67 | 9.70 | 9.00 | 9.90 | ...... | 9.90 | 10.00 | 1.60 | 1.64 | 30.26 | 27.00 | 711 |
| 9.45 | 9.00 | 1.85 | 11.30 | 10.00 | 4.42 | ...... | •4.42 | 5.00 | 1.76 | 1.65 | 27.39 | 23.00 | 1082 |
| 6.28 | 6.00 | .98 | 7.26 | 7.00 | 1.33 | 8.98 | 10.31 | 10.00 | •1.75 | 2.47 | 31.89 | 37.00 | 2007 |
| 8.97 | 8.00 | 1.34 | 10.31 | 9.00 | 6.62 | ...... | 6.62 | 6.00 | •2.20 | 2.47 | 30.94 | 30.00 | 1611 |
| 7.97 | 8.00 | 2.33 | 10.30 | 9.00 | 10.44 | ...... | 10.44 | 10.00 | 1.56 | 1.65 | 31.96 | 25.30 | 475 |
| 8.43 | 8.00 | 1.40 | 9.83 | 9.00 | 3.86 | ...... | 3.86 | 3.00 | 1.01 | .82 | 22.17 | 21.00<br>21.00<br>22.00 | 494<br>65<br>1638 |
| 8.58 | 8.50 | 1.75 | 10.33 | 9.50 | 3.77 | ...... | 3.77 | 2.50 | •.86 | 1.23 | 21.72 | 27.00<br>24.00<br>22.50 | 308<br>66<br>493 |
| 8.34 | 8.00 | 1.22 | 9.56 | 8.50 | 3.13 | ...... | 3.13 | 3.00 | 1.63 | 1.65 | 24.24 | 27.00 | 1699 |
| 7.95 | 6.00 | 1.93 | 9.88 | 6.50 | 4.88 | ...... | 4.88 | 5.00 | 1.48 | 1.23 | 25.29 | 27.00 | 1712 |
| •4.65 | 5.00 | 1.00 | 5.65 | 5.50 | 9.30 | .95 | 10.25 | 10.00 | 1.46 | 1.65 | 26.92 | 28.00 | 488 |
| •7.49 | 8.00 | 2.32 | 9.81 | 8.50 | 10.07 | ...... | 10.07 | 10.00 | 1.70 | 1.65 | 31.16 | 28.50<br>30.00<br>31.00 | 1656<br>1500<br>1960 |
| 7.99 | 8.00 | 1.30 | 9.29 | 8.50 | 4.76 | ...... | 4.76 | 4.00 | 98 | .82 | 22.59 | 24.00<br>24.00 | 1711<br>1961 |
| •7.59 | 8.00 | 1.77 | 9.36 | 8.50 | 2.71 | ...... | 2.71 | 2.00 | 1.02 | .82 | 20.31 | 21.00 | 50 |
| 9.84 | 7.00 | 1.43 | 11.27 | 9.00 | 3.76 | ...... | 3.76 | 2.00 | .94 | 1.00 | 23.28 | 21.00 | 1946 |
| 8.08 | 7.00 | .64 | •8.72 | 9.00 | 5.81 | ...... | 5.81 | 4.00 | 1.20 | 1.25 | 24.31 | 23.00 | 1542 |

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•Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | JOSIAH COPE & CO., BALTIMORE, MD. | | |
| 1541 | Josiah Cope & Co. Ammoniated Phosphate. | Henry Wilson, Frazer, | 7.65 |
| 1553 | Josiah Cope & Co. Potato and Tobacco Phosphate. | Jas. Eavenson, Christiana, | 7.68 |
| 1552 | Josiah Cope & Co. Pure Bono Phosphate, .. | Jas. Eavenson, Christiana, | 7.20 |
| 1929 | Josiah Cope & Co. Try Me Fertilizer, | F. E. Bailey, Northbrook, | 8.30 |
| | JAMES G. DOWNWARD CO., COATESVILLE, PA. | | |
| 415 | †All Crop Fertilizer, | Ed. Miller, New London, | 7.46 |
| 1267 | | H. E. Lehman, Palmyra, | |
| 413 | †Ammoniated Phosphate, | Ed. Miller, New London, | 6.78 |
| 2025 | | Abram Reese, New Providence, . | |
| 1527 | Corn, Wheat and Grass Special, | S. Harry Hibbs, Hulmerville, | 4.30 |
| 1519 | High Grade Pioneer for Tobacco, | Jas. G. Downward, Coatesville, | 6.20 |
| 414 | Special Potato Fertilizer, | Ed. Miller, New London, | 5.58 |
| | WALLACE DUNGAN, DOYLESTOWN, PA. | | |
| 1548 | Pebble Hill Home Made Animal Mixture, | Wallace Dungan, Doylestown, | 7.95 |
| 1549 | Potato Manure, | Wallace Dungan, Doylestown, | 6.53 |
| | AMOS EBY & CO., LEAMAN PLACE, PA. | | |
| 2010 | Pequia Ammoniated, | Ira B. Grabill, Refton, | 9.20 |
| 2011 | Pequia Valley Fertilizer, | Ira B. Grabill, Refton, | 7.13 |
| | ERIE REDUCTION CO., ERIE, PA. | | |
| 817 | Erie Corn and Oat Special, | Chas. Hartly, North East, | 5.45 |
| 818 | Erie Favorite, | Jas. Dobson, North East, | 7.00 |
| 815 | Erie Grain Special, | Gust Schultz, North East, | 7.48 |
| 809 | Erie Potato and Truck Special, | Theilman Seed Co., Erie, | 7.08 |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | | |
| 1302 | †Eureka Complete Compound, | J. D. Beltzel, Mechanicsburg, | 6.20 |
| 790 | | Geo. Zimmerman, Cowan, | |
| 1357 | | C. I. Saylor, Felton, | |
| 1318 | †Eureka Fish and Potash, | N. E. Galbrecht & Bro., Hanover, .. | 5.83 |
| 1301 | | D. J. Beltzel, Mechanicsburg, | |
| 2015 | | New Prov. Coal Co., New Providence. | |
| 343 | †Eureka High Grade Trucker, | Daniel Mader, Linglestown, | 7.65 |
| 1105 | | Henry Oberlin, Reinholds, | |
| 506 | †Eureka Grain and Grass, | Wm. Schwartz, Cressona, | 6.45 |
| 2014 | | New Prov. Coal Co., New Providence. | |
| 1303 | †Eureka Potato and Vegetable, | D. J. Beltzel, Mechanicsburg, | 7.25 |
| 781 | | M. C. Catherman, Millmont, | |
| 2013 | | New Prov. Coal Co., New Providence. | |
| | FARMERS' FERTILIZER WORKS, THE, ELIZABETHTOWN, PA. | | |
| 1862 | Best Yet, | Duncannon Flouring Mill Co., Duncannon. | 3.38 |
| 329 | Grain and Grass Special, | John Sheetz, Elizabethville, | 8.35 |
| 328 | Pride of Donegal, | John Sheetz, Elizabethville, | 6.13 |
| 341 | †Special Potato and Tobacco Manure, ... | M. G. Stricker, Dauphin, | 5.50 |
| 1833 | | B. F. Horting, Newport, | |
| | W. S. FARMER & CO., BALTIMORE, MD. | | |
| 1360 | W. S. Farmer & Co's Climate Phosphate, .. | D. J. Trout, Stewartstown, | 7.05 |
| 1361 | W. S. Farmer & Co's Diamond Back Brand. | D. J. Trout, Stewartstown, | 8.95 |
| 1359 | W. S. Farmer & Co's Pelican Guano, | D. J. Trout, Stewartstown, | 6.25 |
| 43 | W. S. Farmer & Co's Clyde Brand, | J. W. Shoemaker, Littlestown, | 11.23 |
| 44 | W. S. Farmer & Co's Harvest Queen, | J. W. Shoemaker, Littlestown, | 12.72 |
| | JOS. R. GAWTHROP, KENNETT SQUARE, PA. | | |
| 393 | Special Potato Phosphate, | Jos. R. Gawthrop, Kennett Square... | 4.98 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 9.62 | 8.00 | .66 | 10.28 | 9.00 | 2.26 | ...... | *2.26 | 3.00 | *.42 | .82 | 15.70 | 23.00 | 1541 |
| 10.59 | 10.00 | 1.87 | 12.46 | 11.00 | 6.74 | ...... | *6.74 | 7.00 | .87 | .82 | 26.86 | 25.00 | 1553 |
| 10.10 | 9.00 | 5.84 | 15.94 | 13.50 | 3.88 | ...... | 3.88 | 4.00 | 1.85 | 1.85 | 29.94 | 26.00 | 1552 |
| 7.86 | 8.00 | 1.78 | 9.64 | 9.00 | 5.49 | ...... | 5.49 | 4.00 | *1.31 | 1.65 | 24.85 | 24.00 | 1929 |
| 7.83 | 7.00 | .91 | 8.74 | 8.00 | 3.86 | ...... | 3.86 | 3.00 | .42 | .41 | 16.12 | 19.00<br>19.00 | 415<br>1267 |
| 8.11 | 7.00 | .80 | 8.91 | 8.00 | 3.69 | ...... | 3.69 | 3.50 | .83 | .82 | 20.71 | 24.00<br>..... | 418<br>2025 |
| 9.53 | 7.00 | .80 | 10.33 | ...... | 4.06 | ...... | 4.06 | 3.50 | 1.61 | 1.65 | 25.96 | ..... | 1527 |
| 8.27 | 6.00 | 1.19 | 9.46 | 7.00 | 4.26 | ...... | *4.26 | 5.00 | *2.84 | 3.28 | 30.72 | ..... | 1519 |
| 7.26 | 7.00 | 1.20 | 8.46 | 8.00 | 6.48 | ...... | 6.48 | 5.00 | 1.21 | 1.24 | 24.48 | 27.00 | 414 |
| *6.95 | 9.00 | 6.02 | 12.97 | 12.00 | 6.53 | ...... | 6.53 | 5.00 | *2.58 | 3.2 | 32.91 | 30.00 | 1548 |
| *5.12 | 7.00 | 3.92 | 9.04 | 9.00 | 10.80 | .74 | 11.54 | 10.00 | 3.03 | 3.07 | 37.38 | 32.00 | 1549 |
| 11.25 | 10.00 | 1.40 | 12.65 | 12.00 | 2.68 | ...... | 2.68 | 2.00 | .93 | .82 | 23.64 | 20.00 | 2010 |
| 9.49 | 8.00 | 1.53 | 11.02 | 9.00 | 9.06 | 1.60 | 10.66 | 10.00 | 1.60 | 1.65 | 33.32 | 28.00 | 2011 |
| 8.78 | †8.00 | 1.81 | 10.59 | ...... | 4.72 | ...... | 4.72 | 4.00 | .83 | .82 | 22.92 | 21.50 | 817 |
| 9.20 | †8.00 | 3.04 | 12.24 | ...... | 2.28 | ...... | 2.28 | 2.00 | *1.39 | 1.64 | 23.98 | 22.50 | 818 |
| 9.25 | †8.00 | 2.11 | 11.36 | ...... | 2.85 | ...... | 2.85 | 2.00 | 2.33 | 2.46 | 28.46 | 25.00 | 815 |
| 8.46 | †7.00 | 1.98 | 10.44 | ...... | 10.10 | ...... | 10.10 | 10.00 | *1.82 | 2.46 | 32.49 | 33.00 | 809 |
| 7.68 | 7.00 | .73 | 8.41 | 7.50 | 5.24 | ...... | 5.24 | 5.00 | .85 | .82 | 21.79 | 20.00<br>19.25<br>19.00 | 1302<br>790<br>1357 |
| 8.34 | 8.00 | .99 | 9.33 | 8.50 | 1.90 | ...... | 1.90 | 1.00 | .71 | .41 | 18.54 | 15.00<br>15.00<br>15.00 | 1318<br>1301<br>2015 |
| 8.64 | 8.00 | .93 | 9.57 | 8.50 | 9.84 | ...... | 9.84 | 10.00 | 1.63 | 1.65 | 31.20 | 30.00<br>30.00 | 843<br>1105 |
| 8.92 | 8.00 | .54 | 9.46 | 8.50 | 3.01 | ...... | 3.01 | 2.00 | .85 | .82 | 20.68 | 16.20<br>18.00 | 506<br>2014 |
| 8.77 | 8.00 | .89 | 9.66 | 8.50 | 4.52 | ...... | 4.52 | 4.00 | 1.76 | 1.65 | 26.34 | 24.00<br>22.00<br>24.00 | 1303<br>781<br>2013 |
| 9.26 | 8.00 | 1.26 | 10.52 | ...... | 2.00 | 8.52 | 10.52 | 10.00 | 1.63 | 1.6 | 34.71 | 26.00 | 1862 |
| 8.77 | 8.00 | 1.02 | 9.79 | ...... | 4.83 | ...... | 4.83 | 4.00 | .96 | .82 | 23.13 | 19.00 | 329 |
| 7.79 | 7.00 | 2.05 | 9.84 | ...... | 3.60 | 5.05 | 8.65 | 5.00 | 1.66 | 1.65 | 30.90 | 23.00 | 328 |
| 7.12 | 6.00 | 1.54 | 8.66 | ...... | 1.33 | 10.35 | 11.68 | 10.00 | 2.38 | 2.47 | 37.76 | 32.00<br>29.00 | 341<br>1833 |
| 7.73 | 7.00 | 1.09 | 8.82 | 8.00 | 4.44 | ...... | 4.44 | 4.00 | .90 | .82 | 21.43 | 18.00 | 1360 |
| 9.15 | 8.00 | .95 | 10.10 | 9.00 | 4.61 | ...... | *4.61 | 5.00 | 1.28 | 1.03 | 24.81 | 22.00 | 1361 |
| 6.24 | 6.00 | .81 | 7.05 | 7.00 | 2.53 | ...... | *2.53 | 3.00 | .51 | .41 | 16.04 | 16.00 | 1359 |
| 8.48 | 8.00 | 1.11 | 9.59 | 9.00 | 2.21 | ...... | 2.21 | 2.00 | .87 | .82 | 19.72 | 17.50 | 43 |
| 8.81 | 9.00 | 1.81 | 10.62 | 10.00 | 3.32 | ...... | 3.32 | 3.00 | 1.14 | 1.03 | 22.85 | 19.50 | 44 |
| 6.57 | 5.00 | .90 | 7.47 | 6.00 | .66 | 2.53 | 3.19 | 3.00 | 1.11 | .82 | 20.41 | 27.00 | 399 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | | |
| 1190 | †Griffith & Boyd's Cereal Plant Food, ... | Adam Krug, Allenwood, ............ | 7.83 |
| 616 | | H. J. Van Dyke, Gettysburg, ...... | |
| 1596 | | Bear & Long, Lititz, ................ | |
| 1093 | †Griffith & Boyd's Double Strength Tobacco Grower. | Elias Wolf, Akron, ................. | 7.35 |
| 1332 | | Geo. W. Wolf's Sons, York, ........ | |
| 403 | †Griffith & Boyd's Farmer's Potato Manure. | Passmore Co., Nottingham, ......... | 8.23 |
| 201 | | John Hostetler, Walnut, ........... | |
| 521 | | Jas. Lochner, New Tripoli, .......... | |
| 528 | †Griffith & Boyd's Gilt Edge Crop Guano, | J. F. Kuntz, New Tripoli, .......... | 5.60 |
| 580 | | A. K. Kulp, Pottstown, ............ | |
| 223 | †Griffith & Boyd's Farmer's Improved Phosphate. | John Hostetler, Walnut, ........... | 7.73 |
| 1334 | | Geo. Wolf's Sons, Mt. Wolf, ....... | |
| 1989 | Griffith & Boyd's Vegetable Bone, .......... | E. B. Ruhl & Son, Manheim, ....... | 8.95 |
| | FRANK HARTRANFT, COATESVILLE, PA. | | |
| 1002 | Potato Phosphate, ........................... | Preston Powell, West Grove, ....... | 8.83 |
| 1001 | Cook's Phosphate, ........................... | Preston Powell, West Grove, ....... | 9.85 |
| 1000 | Special Phosphate, .......................... | Preston Powell, West Grove, ........ | 12.50 |
| 1014 | Spring Crop Grower Phosphate, ............ | Preston Powell, West Grove, ........ | 9.68 |
| | W. S. HASTINGS & SON, ATGLEN, PA. | | |
| 1511 | Atglen Brand, ................................. | W. S. Hastings & Son, Atglen, ...... | 7.35 |
| | S. M. HESS & BRO., INC., PHILADELPHIA, PA. | | |
| 1074 | S. M. Hess & Bro. Jumbo Complete Formula. | H. D. Weist, Tulpehocken, .......... | 8.55 |
| 546 | †S. M. Hess & Bro. Potato and Truck Manure. | J. F. Mary, Allentown, R. D. 2, ... | 9.58 |
| 213 | | C. W. Book, Port Royal, ............ | |
| 1693 | | J. W. Hartman, Kauffmans, ........ | |
| 197 | †S. M. Hess & Bro. Special Corn Manure, | Irvin Basor, Mifflintown, ............ | 10.58 |
| 98 | | Stephen H. Mast, Elverson, ......... | |
| 876 | | A. F. Hengst, Osterburg, ........... | |
| 714 | S. M. Hess & Bro. Superior Potash Mixture. | C. W. Book, Port Royal, ........... | 8.78 |
| 108 | | Jas. Westley, Mohnton, ............ | |
| 358 | | Geo. F. Wass, Addison, ............ | |
| 1858 | S. M. Hess & Bro., The Scientific Manure, | J. E. Cooper, Landisburg, ......... | 6.68 |
| 215 | †S. M. Hess & Bro. Keystone Phosphate, | C. W. Book, Port Royal, ............ | 8.15 |
| 97 | | Stephen H. Mast, Elverson, R. D. No. 3. | |
| 352 | | J. B. Davis & Sons, Ursina, ........ | |
| 657 | †S. M. Hess & Bro. Special Compound, .. | Harvey T. Troxell, Allentown, Pa., | 9.10 |
| 96 | | Stephen H. Mast, Elverson, ........ | |
| 1200 | | C. A. Shatzberger, Freeburg, ....... | |
| 38 | S. M. Hess & Bro. Tobacco Manure, ........ | Benj. J. Weidner, Lititz, ............ | 8.48 |
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 277 | †Hubbard's Climax Phosphate, ............ | Biglerville Warehouse Co., Biglerville. | 10.63 |
| 192 | | H. M. Ower, Lewistown, ............ | |
| 296 | | J. H. Romberger, Elizabethville, .. | |
| 190 | †Hubbard's Columbia Gem Phosphate, ... | H. M. Ower, Lewistown, ............ | 6.10 |
| 151 | | J. B. Spera, Dillsburg, .............. | |
| 1605 | | D. C. Shuman, Bloomsburg, ........ | |
| 1319 | †Hubbard's Farmer's I. X. L., ............ | J. Emory Maul, Iron Ore, ........... | 5.80 |
| 576 | | F. P. Waite, Tyrone, ............... | |
| 1580 | | J. H. Umbel & Bro., Bird-in-Hand, | |
| 191 | †Hubbard's Jersey Trucker, ............... | H. M. Ower, Lewistown, ............ | 12.05 |
| 141 | | J. B. Spera, Dillsburg, .............. | |
| 575 | | F. P. Waite, Tyrone, ............. | |
| 911 | †Hubbard's Jewel Phosphate, ............ | Howard Bucket, Cessna, .......... | 6.00 |
| 112 | | J. B. Spera, Dillsburg, .............. | |
| 1202 | | L. L. Spangler, Mifflinburg, ........ | |
| 1915 | Hubbard's Money Maker, .................... | James Thompson, Lemont, ......... | 7.78 |
| 899 | Hubbard's Royal Ensign, .................... | Sam'l Rarig, Catawissa, ............ | 5.85 |
| | INTERNATIONAL AGRICULTURAL CORPORATION, PA. BRANCH, BUFFALO, N. Y. | | |
| 2107 | Economy, ........................................ | J. M. Raab & Bro., Midway, ....... | 9.08 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.36 | 8.00 | 2.68 | 11.04 | 9.00 | 2.48 | ...... | 2.48 | 2.00 | .84 | .85 | 20.65 | 18.00<br>20.00<br>21.00 | 1190<br>616<br>1596 |
| 8.31 | 8.00 | 1.76 | 10.07 | 9.00 | 2.82 | ...... | 2.82 | 3.00 | *1.80 | 2.50 | 24.78 | 28.00<br>17.00 | 1093<br>1332 |
| 8.81 | 8.00 | 1.11 | 9.92 | 9.00 | 9.14 | ...... | 9.14 | 9.00 | .80 | .85 | 26.89 | 25.00<br>24.00<br>24.00 | 403<br>201<br>521 |
| 7.85 | 8.00 | 1.72 | 9.57 | 9.00 | 10.50 | ...... | 10.50 | 10.00 | 1.67 | 1.65 | 31.46 | 26.50<br>30.00 | 528<br>980 |
| 8.81 | 7.00 | 3.63 | 12.44 | 8.00 | 2.64 | ...... | 2.64 | 2.00 | .81 | .85 | 21.48 | .....<br>18.00 | 223<br>1334 |
| 8.50 | 8.00 | .40 | 8.90 | 9.00 | 5.72 | ...... | *5.72 | 7.00 | 2.34 | 2.50 | 29.80 | ..... | 1989 |
| 9.24 | 8.00 | 1.34 | 10.58 | 9.00 | 6.52 | ...... | *6.52 | 8.00 | .89 | .82 | 24.70 | 28.00 | 1002 |
| 10.33 | 7.00 | 1.52 | 11.85 | 12.00 | 4.91 | ...... | 4.91 | 3.00 | *1.12 | 1.65 | 25.70 | 30.00 | 1001 |
| 11.98 | 10.00 | 1.66 | 13.64 | 11.00 | 2.78 | ...... | 2.78 | 2.00 | .90 | .82 | 24.44 | 22.00 | 1000 |
| 11.82 | 10.00 | 1.24 | 12.06 | 11.00 | 3.50 | ...... | 3.50 | 2.00 | .61 | .41 | 20.38 | 18.00 | 1014 |
| 8.63 | 8.00 | .60 | 9.23 | ...... | 5.80 | ...... | 5.80 | 5.00 | 1.63 | 1.65 | 27.06 | 23.00 | 1511 |
| 7.80 | 7.00 | 1.16 | 8.96 | 8.00 | 1.65 | ...... | 1.65 | 1.00 | 1.14 | .82 | 19.83 | 20.00 | 1074 |
| 9.17 | 8.00 | 1.28 | 10.45 | 9.00 | 6.33 | ...... | 6.33 | 6.00 | 2.45 | 2.47 | 32.01 | 32.50<br>30.00<br>28.50 | 546<br>213<br>1693 |
| 8.69 | 8.00 | 1.28 | 9.97 | 9.00 | 2.10 | ...... | 2.10 | 2.00 | 82 | .82 | 19.90 | .....<br>24.00<br>19.00 | 197<br>98<br>376 |
| 8.16 | 8.00 | 1.31 | 9.47 | 9.00 | 10.16 | ...... | 10.16 | 10.00 | *1.43 | 1.65 | 30.31 | 29.50<br>30.00<br>32.00 | 214<br>108<br>353 |
| 6.13 | 6.00 | 1.28 | 7.41 | 7.00 | 6.21 | ...... | 6.21 | 5.00 | 1.54 | 1.23 | 24.67 | ..... | 1858 |
| 8.66 | 8.00 | 1.28 | 9.94 | 9.00 | 1.38 | ...... | 1.38 | 1.00 | .75 | .82 | 18.69 | 20.00<br>22.00<br>..... | 215<br>97<br>352 |
| *7.67 | 8.00 | 2.06 | 9.73 | 9.00 | 4.58 | ...... | 4.58 | 4.00 | .84 | .82 | 21.81 | 23.50<br>24.00<br>19.50 | 557<br>96<br>1208 |
| 9.28 | 8.00 | .87 | 10.25 | 9.00 | 4.85 | ...... | *4.85 | 6.00 | *1.78 | 2.47 | 27.55 | ..... | 28 |
| *6.55 | 7.00 | 2.09 | 8.64 | 8.00 | 4.58 | ...... | 4.58 | 4.00 | .82 | .82 | 20.43 | 20.00<br>21.00<br>19.00 | 277<br>192<br>296 |
| 7.93 | 8.00 | .87 | *8.80 | 9.00 | 3.14 | ...... | 3.14 | 2.00 | .46 | .41 | 15.70 | 18.00<br>16.50<br>15.00 | 190<br>151<br>1605 |
| *7.75 | 8.00 | 1.57 | 9.32 | 9.00 | 3.53 | ...... | 3.53 | 2.00 | 1.79 | 1.64 | 24.88 | 21.00<br>22.00<br>21.00 | 1319<br>576<br>1580 |
| 8.37 | 8.00 | .62 | 8.99 | 9.00 | 9.27 | ...... | *9.27 | 10.00 | 1.83 | 1.64 | 31.12 | 30.00<br>28.00<br>32.00 | 191<br>141<br>575 |
| *7.60 | 8.00 | .94 | *8.54 | 9.00 | 7.89 | ...... | 7.89 | 5.00 | 1.83 | 1.00 | 29.11 | 22.00<br>22.00<br>16.00 | 911<br>142<br>1202 |
| 8.30 | 8.00 | 1.76 | 10.06 | 9.00 | 4.67 | ...... | *4.67 | 5.00 | 1.69 | 1.64 | 26.71 | ..... | 1915 |
| 8.28 | 8.00 | 1.49 | 9.87 | 9.00 | 4.95 | ...... | 4.95 | 4.00 | 2.40 | 2.46 | 29.62 | 25.00 | 899 |
| 8.15 | 8.00 | 1.85 | 10.00 | 9.00 | 4.45 | ...... | 4.45 | 4.00 | 1.76 | 1.60 | 26.12 | 22.00 | 2197 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y. | | |
| 1456 | †Fish Guano, | H. B. Edwards & Co., Titusville, | 7.25 |
| 1780 | | C. D. Bower & Bro., Berwick, | |
| 1476 | Garden Truck, | H. B. Hoon, Mercer, | 8.78 |
| 10 | General Favorite, | J. M. Owens, Strattonville, | 13.63 |
| 1753 | †Ideal Wheat and Corn, | Harmony Cereal Mills, Harmony, | 9.60 |
| 1477 | | H. B. Hoon, Mercer, | |
| 1901 | | D. H. Shivery, Bellefonte, | |
| 170 | Vegetable and Potato, | J. Wilson Hamilton, Meadville, | 11.70 |
| | JARECKI CHEMICAL CO., THE, SANDUSKY, OHIO. | | |
| 161 | Fish Phosphate and Potash Tobacco and Potato Food. | C. S. Garwood, Linesville, | 12.20 |
| 1459 | Lake Erie Guano with Phosphate and Potash. | Clark Bros., Oil City, | 9.93 |
| 2193 | No. One Formula, | J. M. Raab & Bro., Midway, | 5.35 |
| | KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA. | | |
| 1543 | Keystone Corn and Cereal Grower, | Wm. M. Holbert, Warrington, | 9.53 |
| 1777 | Keystone Gold Medal Special, | P. K. Smith, Nescopeck, | 6.33 |
| 661 | †Keystone 20th Century Special, | E. A. Slagle, Paxinos, | 7.10 |
| 1774 | | P. K. Smith, Nescopeck, | |
| | LANCASTER BONE FERTILIZER CO., LANCASTER, PA. | | |
| 819 | †Complete Ammoniated Bone Manure, | A. L. Veit, McKean, | 7.23 |
| 396 | | Daniel Replogle, Woodbury, | |
| 1346 | | Josiah Thrichbaugh, Windsor, | |
| 637 | National Crop Grower, | J. H. Duttera, New Oxford, | 10.43 |
| 873 | †Potato, Fruit and Vegetable, | Chas. Oster, Elk Lick, | 6.43 |
| 877 | | E. M. Wenger, Fredericksburg, | |
| 874 | †Potato, Tobacco and Truck Manure, | S. Z. Gettle, Myerstown, | 7.33 |
| 1345 | | Josiah Thrichbaugh, Windsor, | |
| 820 | †Special Guano, | A. L. Veit, McKean, | 5.83 |
| 1344 | | Josiah Thrichbaugh, Windsor, | |
| | LANCASTER CHEMICAL CO., LANCASTER, PA. | | |
| 772 | General Crop Special, No. 15, | Emil Ward, Thompsontown, | 9.58 |
| 773 | Hard Times Fertilizer, No. 6, | Emil Ward, Thompsontown, | 6.10 |
| 203 | Keystone Brand, No. 11, | C. S. Winey, McAlisterville, | 11.23 |
| 1115 | No. 1 Tobacco and Vegetable, | J. B. Myers, Leola, | 8.33 |
| 1116 | No. 2 Dewey Brand for Tobacco and Spring Crops. | J. B. Myers, Leola, | 7.00 |
| | LEBANON FERTILIZER WORKS, LEBANON, PA. | | |
| 500 | Levan's Harvest Queen Fertilizer, | Horace Kintzel, Pine Grove, | 5.05 |
| 876 | Levan's Royal Potash Compound, | M. L. Bachman, Lebanon, | 8.50 |
| 559 | †Levan's Special Corn Fertilizer, | Ed. Mayberry, Pine Grove, | 7.13 |
| 1071 | | Adam Gerhart, Rehresburg, | |
| 1273 | Levan's Special Potato and Tobacco, | Christian M. Brandt, Palmyra, | 6.20 |
| 1255 | †Levan's Special Truck Fertilizer, | C. F. Snyder, Snyders, | 7.15 |
| 1796 | | Frank Gerhart, Orwigsburg, | |
| 1272 | Levan's Wheat and Grass Special, | Christian M. Brandt, Palmyra, | 7.28 |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | | |
| 1056 | †Lister's Corn and Potato Frtilizer. | Morrow & Buxton, Valencia, | 9.63 |
| 1331 | | J. E. Smith, York, | |
| 232 | †Lister's G. Brand, | Knecht Milling Co., Parvin, | 10.50 |
| 158 | | Wm. H. Schriver, Dillsburg, | |
| 292 | | Uriah Daniel, Gratz, | |
| 518 | †Lister's New York Special Fertilizer, | R. D. Sames, Coopersburg, | 9.45 |
| 201 | | Uriah Daniel, Gratz, | |
| 779 | | R. J. Bigaman, Mifflinburg, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.84 | 9.00 | 2.00 | 10.84 | 10.00 | 2.65 | ...... | 2.65 | 2.00 | .87 | .80 | 20.96 | 22.00<br>18.50 | 1456<br>1780 |
| 8.19 | 8.00 | 1.67 | 9.86 | 9.00 | 6.13 | 1.08 | 7.21 | 7.00 | 3.53 | 3.30 | 37.36 | 34.00 | 1476 |
| 7.91 | 8.00 | 1.78 | 9.69 | 9.00 | 5.31 | ...... | 5.31 | 2.50 | *.80 | 1.20 | 22.39 | 22.50 | 10 |
| 9.10 | 9.00 | 1.72 | 10.82 | 10.00 | 5.66 | ...... | 5.66 | 5.00 | 1.84 | 1.00 | 28.70 | 24.00<br>25.50<br>..... | 1753<br>1477<br>1901 |
| 8.71 | 8.00 | .89 | 9.60 | 9.00 | 8.37 | ...... | 8.37 | 7.00 | 2.51 | 2.40 | 33.63 | 28.00 | 170 |
| 8.92 | 8.00 | 1.36 | 10.28 | 9.00 | 3.90 | ...... | 3.90 | 4.00 | 1.21 | .83 | 23.64 | 23.00 | 104 |
| 8.82 | 8.00 | 1.70 | 10.52 | 9.00 | 2.43 | ...... | 2.43 | 2.50 | 1.2[illegible] | 1.25 | 22.16 | 26.00 | 1459 |
| *6.88 | 8.00 | 2.06 | 8.94 | 9.00 | 2.06 | ...... | 2.06 | 2.00 | .94 | .82 | 18.85 | 21.00 | 2198 |
| *7.78 | 8.00 | 1.16 | 8.94 | 9.00 | 5.42 | ...... | 5.42 | 4.00 | 1.72 | 1.65 | 26.17 | 27.00 | 1546 |
| 8.56 | 8.00 | 1.29 | 9.85 | 10.00 | 6.67 | 3.61 | 10.28 | 10.00 | 3.14 | 3.28 | 39.49 | 34.00 | 1777 |
| 8.01 | 5.00 | 1.05 | 9.06 | 6.00 | 10.42 | ...... | 10.42 | 10.00 | 1.27 | 1.23 | 29.37 | 25.00<br>25.00 | 661<br>1774 |
| 7.95 | 8.00 | .77 | *8.72 | 9.00 | 2.45 | ...... | 2.45 | 2.00 | .86 | .82 | 19.24 | 20.00<br>19.00<br>20.00 | 819<br>396<br>1346 |
| 9.39 | 8.00 | .17 | 9.56 | 9.00 | 2.35 | ...... | 2.35 | 1.00 | .47 | .41 | 15.68 | 16.50 | 637 |
| *6.59 | 7.00 | .37 | *6.96 | 8.00 | 7.03 | ...... | 7.03 | 7.00 | *.46 | .82 | 20.54 | .....<br>..... | 873<br>877 |
| 8.36 | 8.00 | .45 | 8.81 | 9.00 | 7.77 | ...... | *7.77 | 8.00 | 1.61 | 1.60 | 28.34 | 28.50<br>22.00 | 874<br>1345 |
| *6.58 | 7.00 | .99 | *7.57 | 8.00 | 4.27 | ...... | 4.27 | 4.00 | .81 | .8[illegible] | 19.54 | 22.00<br>21.00 | 820<br>1344 |
| 8.91 | 8.00 | 1.89 | 10.88 | 9.00 | 1.33 | 4.08 | *5.41 | 6.00 | 1.61 | 1.65 | 28.29 | 25.55 | 772 |
| *7.13 | 8.00 | 3.76 | 10.89 | 9.00 | 2.00 | .66 | 2.66 | 2.00 | .65 | .41 | 16.69 | 17.55 | 773 |
| 9.56 | 7.00 | 3.55 | 13.11 | 8.00 | 1.81 | ...... | 1.81 | 1.00 | .80 | .82 | 18.04 | ..... | 208 |
| 8.58 | 7.50 | 2.63 | 11.21 | 8.50 | .53 | 5.57 | *6.10 | 7.00 | *1.57 | 2.06 | 29.05 | 30.50 | 1115 |
| 8.38 | 8.00 | 1.40 | 9.78 | 9.00 | .66 | 3.71 | 4.37 | 4.00 | 1.18 | 1.23 | 24.44 | 22.50 | 1116 |
| *7.28 | 8.00 | 2.01 | 9.29 | 9.00 | 8.53 | .55 | *9.08 | 10.00 | *2.84 | 3.30 | 35.23 | 32.50 | 500 |
| 9.62 | 8.00 | .36 | 9.98 | 9.00 | 5.65 | ...... | 5.65 | 5.00 | *1.43 | 1.65 | 26.78 | 24.00 | 876 |
| 8.17 | 8.00 | .60 | *8.77 | 9.00 | 2.97 | ...... | 2.97 | 2.00 | 1.07 | .82 | 20.80 | 16.00<br>18.75 | 559<br>1071 |
| 8.66 | 8.00 | .66 | 9.32 | 9.00 | 6.11 | ...... | 6.11 | 6.00 | *1.27 | 1.65 | 25.40 | 23.00 | 1273 |
| 7.63 | 7.00 | .73 | 8.36 | 8.00 | 10.50 | ...... | 10.50 | 10.00 | 1.71 | 1.65 | 31.00 | .....<br>26.00 | 1255<br>1796 |
| *7.61 | 8.00 | .76 | *8.37 | 9.00 | 3.04 | ...... | 3.04 | 1.50 | 1.37 | 1.23 | 21.78 | 18.00 | 1272 |
| 8.32 | 8.00 | 1.26 | 9.58 | 9.00 | 3.59 | ...... | 3.59 | 3.00 | 1.66 | 1.65 | 24.72 | 25.50<br>24.00 | 1056<br>1331 |
| 7.81 | 8.00 | 1.73 | 9.54 | 9.00 | 4.06 | ...... | 4.06 | 4.00 | .85 | .82 | 21.20 | 22.00<br>21.00<br>19.00 | 232<br>138<br>292 |
| 8.56 | 8.00 | 1.05 | 9.61 | 9.00 | 10.52 | ...... | 10.52 | 10.00 | .85 | .82 | 28.22 | 26.00<br>24.00<br>23.00 | 518<br>291<br>779 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 1455 | Lister's Pennsylvania Special, | Frank P. Allen, Titusville, | 10.18 |
| 137 | †Lister's Potato Manure, | Wm. H. Schriver, Dillsburg, | 8.53 |
| 1410 | †Lister's Special 10% Potato Fertilizer, | D. W. Bortz, Greensburg, | 10.65 |
| 636 | | T. H. Hoffman, Neffs, | |
| 293 | | Uriah Daniel, Gratz, | |
| 974 | | Sylvester Garr, Easton, | |
| 1103 | Lister's Special Tobacco Fertilizer, | J. Frank Lutz, Stevens, | 8.98 |
| 923 | †Lister's Success Fertilizer, | P. O. Harned, Edinboro, | 10.48 |
| 1058 | | Morrow & Buxton, Valencia, | |
| 1057 | Lister's 3-6-10 Potatoes, | Morrow & Buxton, Valencia, | 7.25 |
| 967 | †Lister's U. S. Super Phosphate, | Thos. Arndt, Danielsville, | 8.70 |
| 656 | | Daniel Lahr, Dornsipe, | |
| 1804 | | John Boyer, Klingerstown, | |
| | FREDERICK LUDLAM CO., BALTIMORE, MD. | | |
| 1297 | Ludlam's Cecrops Fertilizers, A. B. F. Brand. | W. H. Caller, Allen, | 10.53 |
| 1823 | †Ludlam's Cecrops Fertilizer, Harvest Queen. | Sechrist & Ihrig, York, | 9.90 |
| 1010 | | Wm. Albright, Cochranville, | |
| 1903 | | G. C. Miller, Ax Mann, | |
| 1309 | †Ludlam's Cecrops Fertilizers, No. 2 for Grain and Grass. | Jacob Fleisher, Marysville, | 8.75 |
| 1324 | | Sechrist & Ihrig, York, | |
| 1236 | †Ludlam's Cecrops Fertilizers, Potato and Tobacco. | A. A. Guss, Lewistown, | 8.95 |
| 1326 | | Sechrist & Ihrig, York, | |
| 1325 | †Ludlam's Cecrops Fertilizers, Spring Special. | Sechrist & Ihrig, York, | 8.75 |
| 1011 | | Wm. Albright, Cochranville, | |
| 1902 | | G. C. Miller, Ax Mann, | |
| 157 | Ludlam's Cecrops Fertilizers, Standard, | Amos T. Bushey, York Springs, | 10.48 |
| 1308 | †Ludlam's Cecrops Fertilizers, Standard Potash. | Jacob Fleisher, Marysville, | 9.95 |
| 1327 | | Sechrist & Ihrig, York, | |
| | MAPES FORMULA AND PERUVIAN GUANO CO., THE, NEW YORK. | | |
| 1591 | †The Mapes Average Soil Complete Manure. | W. H. Muth & Co., Lititz, | 7.23 |
| 1704 | | Jacob Kech Sons, Kress, | |
| 988 | †The Mapes Economical Potato Manure, | H. S. Beidler, Doylestown, | 5.83 |
| 1589 | | W. H. Muth & Co., Lititz, | |
| 987 | †The Mapes General Crop Brand, | H. S. Beidler, Doylestown, | 5.12 |
| 1592 | | H. W. Muth & Co., Lititz, | |
| 46 | The Mapes Cereal Brand, | Hilles & Taggart, Norristown, | 6.90 |
| 39 | The Mapes Complete Manure for General Use. | Benj. Weidner, | 6.37 |
| 1240 | †Mapes Potato Manure, | A. F. Kimmell, Norristown, | 5.60 |
| 975 | | Hilles & Taggert, Norristown, | |
| 1624 | | Jno. Osterstock, Easton, | |
| 1590 | Mapes Tobacco Starter Improved, | W. H. Muth & Co., Lititz, | 6.73 |
| 1594 | Mapes Tobacco Manure (Wrapper Brand), | W. H. Muth & Co., Lititz, | 4.80 |
| 446 | †Mapes Top Dresser, Improved, Full Strength. | Hilles & Taggart, Norristown, | 6.00 |
| 1241 | | A. F. Kimmel, Orwigsburg, | |
| 1593 | Mapes Top Dresser, Improved, Half Strength. | W. H. Muth & Co., Lititz, | 7.20 |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | | |
| 1587 | Martin's Bull Head Fertilizer for Cotton and Tobacco. | J. T. Fisher, Lancaster, R. D. 6 | 9.98 |
| 802 | Martin's Corn and Cereal Special, | Chas. Zeller, Lewisburg, | 9.90 |
| 347 | †Martin's Gilt Edge Potato Manure, | J. H. Griegrich, Hershey, | 9.33 |
| 1991 | | Lanc. Co. Farmers' Asso., Manheim, | |
| 780 | †Martin's One, Eight and Four, | Frank Rhule, Mifflinburg, | 11.80 |
| 462 | | Ed. Houck, Bangor, | |
| 1242 | | A. F. Kimmel, Orwigsburg, | |
| 283 | †Martin's Prize Potato, | David Reigel, Jonestown, | 9.98 |
| 193 | | T. J. Novinger, Lewistown, | |
| 400 | | Passmore & Co., Nottingham, | |
| 401 | †Martin's Special Compound, | Passmore & Co., Nottingham, | 10.20 |
| 346 | | J. H. Gingrich, Hershey, | |
| 542 | | Amandus Weating, Schneidersville, | |
| 282 | †Martin's Potato Manure, | David Reigel, Jonestown, | 11.05 |
| 140 | | Cook & Co., Dillsburg, | |
| 461 | | Ed. Houck, Bangor, | |
| 463 | Martin's Sure Grower, | Ed Houck, Bangor, | 8.98 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 7.38 | 8.00 | 1.35 | 9.23 | 9.00 | 5.80 | ...... | 5.80 | 5.00 | 1.29 | .82 | 24.44 | 24.00 | 1455 |
| *7.39 | 8.00 | 2.18 | 9.57 | 9.00 | 8.17 | ...... | 8.17 | 7.00 | 3.64 | 3.29 | 37.94 | 35.00 | 187 |
| | | | | | | | | | | | | 40.00 | 1440 |
| 7.82 | 8.00 | 2.17 | 9.99 | 9.00 | 9.33 | 1.79 | 11.12 | 10.00 | 1.61 | 1.65 | 32.49 | ..... | 536 |
| | | | | | | | | | | | | 26.50 | 293 |
| | | | | | | | | | | | | ..... | 974 |
| 9.64 | 8.00 | 1.15 | 10.79 | 9.00 | 4.45 | ...... | 4.45 | 3.00 | 2.29 | 2.06 | 29.82 | 26.00 | 1103 |
| 8.84 | 9.00 | 1.38 | 10.22 | 10.00 | 2.35 | ...... | 2.35 | 2.00 | 1.36 | 1.25 | 22.63 | 22.00 | 823 |
| | | | | | | | | | | | | 24.50 | 1058 |
| 6.59 | 6.00 | .64 | 7.23 | 7.00 | 9.99 | ...... | 9.99 | 10.00 | *2.15 | 2.47 | 31.45 | 34.00 | 1057 |
| 8.94 | 8.00 | 1.02 | 9.96 | 9.00 | 2.48 | ...... | 2.48 | 2.00 | 1.07 | 1.08 | 21.36 | ..... | 656 |
| | | | | | | | | | | | | 20.50 | 967 |
| | | | | | | | | | | | | 19.00 | 1804 |
| 8.59 | 8.00 | 1.21 | 9.80 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.63 | 1.65 | 23.56 | ..... | 1297 |
| 8.54 | 8.00 | 1.28 | 9.82 | 9.00 | 2.46 | ...... | 2.46 | 2.00 | .81 | .82 | 19.87 | 18.65 | 1323 |
| | | | | | | | | | | | | 21.00 | 1010 |
| | | | | | | | | | | | | 20.00 | 1903 |
| 7.55 | 7.00 | 1.25 | 8.80 | 8.00 | 1.57 | ...... | 1.57 | 1.00 | .87 | .82 | 18.16 | ..... | 1309 |
| | | | | | | | | | | | | 17.40 | 1324 |
| 8.08 | 8.00 | 1.75 | 9.83 | 9.00 | 10.00 | ...... | 10.00 | 10.00 | 1.46 | 1.65 | 30.32 | 28.00 | 1236 |
| | | | | | | | | | | | | 27.70 | 1326 |
| 9.38 | 9.00 | 1.05 | 10.43 | 10.00 | 7.96 | ...... | 7.96 | 7.00 | .81 | .82 | 26.25 | 22.80 | 1325 |
| | | | | | | | | | | | | 25.00 | 1011 |
| | | | | | | | | | | | | 24.00 | 1902 |
| 8.18 | 8.00 | 1.47 | 9.65 | 9.00 | 5.67 | ...... | 5.67 | 5.00 | 1.90 | 1.65 | 27.88 | 22.00 | 157 |
| 8.61 | 8.00 | 1.31 | 9.92 | 9.00 | 3.94 | ...... | 3.94 | 4.00 | .78 | .82 | 21.48 | ..... | 1308 |
| | | | | | | | | | | | | 20.10 | 1327 |
| 7.17 | 7.00 | 2.13 | 9.30 | ...... | 1.20 | 4.60 | 5.80 | 5.00 | 4.06 | 4.12 | 38.22 | 37.00 | 1591 |
| | | | | | | | | | | | | 36.00 | 1704 |
| *3.60 | 4.00 | 3.15 | 6.75 | 6.00 | 1.46 | 7.97 | 9.43 | 8.00 | 3.28 | 3.29 | 36.19 | 37.00 | 988 |
| | | | | | | | | | | | | 37.00 | 1589 |
| *6.90 | 8.00 | 2.98 | 9.88 | 10.00 | 2.78 | ...... | 2.78 | 2.00 | 1.80 | 1.65 | 23.95 | 28.00 | 987 |
| | | | | | | | | | | | | 24.00 | 1592 |
| 6.49 | 6.00 | 2.13 | 8.62 | 8.00 | 2.53 | .96 | 3.49 | 3.00 | 1.76 | 1.65 | 23.83 | 30.00 | 46 |
| 9.53 | 8.00 | 2.07 | 11.60 | 10.00 | 4.13 | .55 | 4.68 | 4.00 | 3.66 | 2.29 | 36.70 | ..... | 89 |
| *7.30 | 8.00 | 2.51 | 9.81 | 9.00 | 1.33 | 6.46 | 7.79 | 6.00 | 3.71 | 3.71 | 39.43 | 40.00 | 1240 |
| | | | | | | | | | | | | 42.00 | 975 |
| | | | | | | | | | | | | 35.00 | 1624 |
| 7.24 | 6.00 | 1.56 | 8.80 | 8.00 | 1.20 | 1.09 | 2.29 | 1.00 | 4.06 | 4.12 | 33.62 | 37.00 | 1590 |
| 2.71 | ...... | 2.68 | 5.39 | 4.50 | 5.46 | 4.90 | 10.36 | 10.50 | 6.24 | 6.18 | 48.69 | 49.00 | 1594 |
| 5.97 | 5.00 | 2.86 | 8.83 | 8.00 | .80 | 4.23 | 5.08 | 4.00 | *9.21 | 9.88 | 60.01 | 58.00 | 446 |
| | | | | | | | | | | | | 53.00 | 1241 |
| 2.83 | 2.50 | 2.04 | 4.87 | 4.00 | .53 | 1.90 | 2.43 | 2.00 | *4.73 | 4.94 | 32.89 | 31.00 | 1598 |
| 9.65 | 8.00 | 1.34 | 10.09 | ...... | 3.84 | ...... | 3.84 | 3.00 | 2.38 | 2.47 | 32.04 | 24.00 | 1587 |
| 8.55 | 8.00 | 2.45 | 11.00 | ...... | 3.30 | ...... | 3.30 | 2.00 | 1.64 | 1.65 | 25.20 | ..... | 802 |
| 7.18 | 7.00 | 1.90 | 9.08 | ...... | 10.73 | ...... | 10.73 | 10.00 | 2.36 | 2.47 | 34.34 | 28.50 | 347 |
| | | | | | | | | | | | | 28.00 | 1991 |
| 8.59 | 8.00 | 1.11 | 9.70 | ...... | 4.72 | ...... | 4.72 | 4.00 | .98 | .82 | 23.06 | ..... | 780 |
| | | | | | | | | | | | | 20.00 | 462 |
| | | | | | | | | | | | | 18.00 | 1242 |
| 7.98 | 8.00 | 1.91 | 9.84 | ...... | 9.33 | 1.33 | 10.66 | 10.00 | 1.64 | 1.65 | 32.13 | 26.00 | 283 |
| | | | | | | | | | | | | 28.00 | 193 |
| | | | | | | | | | | | | 27.00 | 400 |
| 8.07 | 8.00 | 3.24 | 11.31 | ...... | 5.40 | ...... | 5.40 | 5.00 | 1.65 | 1.65 | 27.20 | 24.00 | 401 |
| | | | | | | | | | | | | 22.00 | 346 |
| | | | | | | | | | | | | 23.00 | 542 |
| 8.80 | 8.00 | 1.17 | 9.97 | ...... | 5.32 | ...... | 5.32 | 5.00 | .85 | .82 | 23.22 | 18.50 | 282 |
| | | | | | | | | | | | | 19.25 | 149 |
| | | | | | | | | | | | | 21.00 | 461 |
| 8.26 | 8.00 | 1.21 | 9.47 | ...... | 1.47 | ...... | 1.47 | 1.00 | 1.03 | .82 | 19.65 | 17.00 | 463 |

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*Constituent falls below guaranty

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **MEDICUS FERTILIZER CO., INC., PHILADELPHIA, PA.** | | |
| 1918 | Medicus Corn and Potato Manure, | W. S. Buchman, Hatboro, | 11.70 |
| 1917 | Medicus Vegetable Guano, | W. S. Buchman, Hatboro, | 12.23 |
| | **F. MEHRING, KEYMAR, MD.** | | |
| 701 | General Crop Grower, | J. N. Slifer, Littlestown, | 6.40 |
| 702 | Twenty-Six Dollar Phosphate, | J. N. Slifer, Littlestown, | 6.63 |
| | **HENRY F. MICHELL CO., PHILADELPHIA, PA.** | | |
| 55 | Michell's High Grade Ammoniated Phosphate. | Henry F. Michell, Philadelphia, | 5.90 |
| | **MILLER FERTILIZER CO., THE, BALTIMORE, MD.** | | |
| 804 | Club Brand, | A. P. Forseman, Allenwood, | 8.63 |
| 236 | †Farmer's Profit, | W. L. Wolfe, Boonville, | 7.73 |
| 220 | | O. B. Esh, Spruce Hill, | |
| 503 | | John A. Miller, Pine Grove, | |
| 275 | †Harvest Queen Phosphate, | Biglerville Warehouse Co., Biglerville. | 7.85 |
| 218 | | O. B. Esh, Spruce Hill, | |
| 1390 | | J. M. Lutz, Shirleysburg, | |
| 1312 | †Hustler Phosphate, | Wm. Overdorff, Windsor, | 7.18 |
| 1947 | | Miller T. Hoskins, Hickory Hill, | |
| 1362 | †Pimlico, | J. H. Bartenslager, Stewartstown, | 5.83 |
| 504 | | Jno. A. Miller, Pine Grove, | |
| 1875 | | Jacob F. Good, Midvale, | |
| 1207 | Potato Vegetable Grower, | Howard Kliegle, Selinsgrove, | 5.40 |
| 1950 | Standard Phosphate, | Miller T. Harkins, Hickory Hill, | 4.28 |
| 1300 | †W. G. Phosphate, | J. R. Miller's Sons, New Kingston, | 6.80 |
| 1335 | | Brillinger & Swartz, Ernigsville, | |
| | **NASSAU FERTILIZER CO., NEW YORK.** | | |
| 524 | †Common Sense Potato Manure, | Wm. H. Hoffman, New Tripoli, | 10.25 |
| 384 | | F. B. Corle, Piara, | |
| 1205 | | S. J. Straub, Selinsgrove, | |
| 552 | †General Favorite, | Clinton Grammes, Trexlertown, | 9.50 |
| 379 | | Ross Sloucker, St. Clairsville, | |
| 662 | | Chas. Usher, E. Smithfield, | |
| 1246 | Old Hickory, | M. D. Wittimer, Pine Grove, | 7.93 |
| 525 | †Special Potato Fertilizer, | Wm. H. Hoffman, New Tripoli, | 8.45 |
| 672 | | Chas. Usher, E. Smithfield, | |
| | **G. OBER & SONS CO., BALTIMORE, MD.** | | |
| 1853 | Ober's Sea Island Fish Guano, | A. H. Ulsh, Millerstown, | 5.05 |
| 366 | †Ober's Special Plant Food, | Shipley Hdw. Co., Meyersdale, | 7.83 |
| 622 | | D. Blocker & Co., Gettysburg, | |
| 650 | †Ober's Stag Guano, | Jno. Phillips, Sunbury, | 5.93 |
| 621 | | D. Blocher & Co., Gettysburg, | |
| 950 | | S. S. Mosholder, Rockwood, | |
| | **OXFORD PACKING WORKS, OXFORD, PA.** | | |
| 58 | O. P. W. No. 4, | Geo. Brogan, Nottingham, | 12.05 |
| | **OYLER & SPANGLER, GETTYSBURG, PA.** | | |
| 626 | Acidless, | Oyler & Spangler, Gettysburg, | 4.05 |
| | **PATAPSCO GUANO CO., BALTIMORE, MD.** | | |
| 766 | †Patapsco B. B. & P., | Jno. Harley, Thompsontown, | 9.58 |
| 454 | | Wm. Hummer, Martin's Creek, | |
| 934 | | P. J. Blough's Sons, Hooversville, | |
| 1171 | Patapsco Best Grade Fertilizer, | E. H. Meeker, Willawanna, | 7.98 |
| 320 | †Coon Brand Guano, | Russell Bros., Washington, | 13.85 |
| 173 | | Kramer & Son, Springboro, | |
| 620 | | E. C. Thomas, Gettysburg, | |
| 319 | †Patapsco Corn and Tomato Fertilizer, | Russell Bros., Washington, | 11.93 |
| 175 | | Kramer & Son, Springboro, | |
| 800 | | R. E. Hamer, Lewisburg, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| *7.45 | 8.00 | 2.72 | 10.17 | ...... | 11.57 | ...... | 11.57 | 10.00 | *1.25 | 1.65 | 30.78 | 27.00 | 1918 |
| 7.74 | 6.00 | 3.29 | 11.03 | ...... | 7.20 | ...... | 7.20 | 6.00 | *1.32 | 1.65 | 27.16 | 23.00 | 1917 |
| 10.99 | 10.00 | 4.23 | 15.22 | 11.00 | 2.46 | ...... | 2.46 | 1.50 | 1.20 | .82 | 25.60 | 17.00 | 701 |
| 12.32 | 11.00 | 2.52 | 14.84 | 12.00 | 2.81 | ...... | 2.81 | 1.50 | 1.33 | 1.24 | 27.21 | 19.00 | 702 |
| 10.22 | ‡8.50 | 3.41 | 13.63 | ...... | 1.68 | ...... | 1.68 | 1.00 | 1.86 | 1.65 | 26.66 | 25.00 | 55 |
| 8.18 | 8.00 | .51 | 8.69 | 8.50 | 2.27 | ...... | 2.27 | 2.00 | .52 | .42 | 17.58 | 15.00 | 804 |
| 8.27 | 8.00 | .73 | 9.00 | 8.50 | 5.18 | ...... | 5.18 | 5.00 | .94 | .83 | 22.81 | 22.00<br>19.50<br>20.00 | 236<br>220<br>503 |
| 9.38 | 9.00 | .51 | 9.89 | 9.50 | 3.30 | ...... | 3.30 | 2.75 | 1.02 | 1.03 | 22.16 | 21.00<br>19.25<br>22.50 | 275<br>218<br>1390 |
| 8.09 | 8.00 | .99 | 9.08 | 8.50 | 1.20 | ...... | 1.20 | 1.00 | .84 | .83 | 18.25 | 18.00<br>19.00 | 1342<br>1947 |
| 8.58 | 8.00 | .70 | 9.28 | 8.50 | 6.26 | 3.59 | 9.85 | 10.00 | 2.06 | 1.65 | 33.78 | 27.00<br>27.50<br>28.00 | 1362<br>504<br>1875 |
| 8.26 | 8.00 | 1.08 | 9.34 | 8.50 | 3.90 | ...... | 3.90 | 4.00 | *.86 | 1.65 | 21.20 | ..... | 1207 |
| 8.70 | 8.00 | .80 | 9.50 | 8.50 | 3.32 | ...... | 3.32 | 3.00 | *1.93 | 2.47 | 22.69 | 28.00 | 1950 |
| 7.75 | 7.00 | .88 | 8.63 | 7.50 | 1.79 | ...... | 1.79 | 1.00 | .52 | .42 | 19.42 | 15.80<br>15.00 | 1300<br>1335 |
| 8.77 | 8.00 | 1.15 | 9.92 | 9.00 | 4.11 | ...... | 4.11 | 4.00 | 1.58 | 1.65 | 25.36 | 24.00<br>26.00<br>22.50 | 524<br>384<br>1205 |
| 8.57 | 8.00 | 1.36 | 9.93 | 9.00 | 4.46 | ...... | 4.46 | 4.00 | .86 | .82 | 22.23 | 19.75<br>.....<br>22.50 | 553<br>379<br>663 |
| 10.53 | 10.00 | .88 | 11.41 | 11.00 | 7.92 | ...... | 7.92 | 8.00 | 1.00 | .82 | 28.20 | ..... | 1246 |
| 8.25 | 8.00 | 1.36 | 9.61 | 9.00 | 9.60 | .20 | *9.80 | 10.00 | 1.66 | 1.65 | 31.03 | 27.00<br>31.00 | 525<br>672 |
| *7.36 | 8.00 | 2.64 | 10.00 | 9.00 | 10.46 | ...... | 10.46 | 2.00 | 1.70 | 1.65 | 31.58 | 21.00 | 1858 |
| 9.23 | 9.00 | .66 | 9.89 | 10.00 | 6.35 | ...... | 6.35 | 5.00 | *1.28 | 1.65 | 26.55 | 28.00<br>25.00 | 366<br>622 |
| 7.94 | 8.00 | .50 | *8.44 | 9.00 | 5.75 | ...... | 5.75 | 4.00 | .78 | .82 | 22.27 | 20.00<br>21.00<br>18.75 | 650<br>621<br>950 |
| 10.08 | 10.00 | 1.20 | 11.28 | ...... | 3.28 | ...... | 3.28 | 3.00 | .61 | .41 | 18.21 | ..... | 58 |
| *5.96 | 7.00 | 4.10 | 10.06 | 9.00 | 8.66 | ...... | 8.66 | 8.00 | *2.16 | 2.47 | 31.06 | 30.00 | 626 |
| 8.95 | 8.00 | .78 | 9.73 | 9.00 | 2.43 | ...... | 2.43 | 2.00 | .47 | .41 | 15.68 | 16.00<br>18.00<br>19.00 | 766<br>454<br>934 |
| 7.97 | 8.00 | 1.41 | 9.41 | 9.00 | 10.87 | ...... | 10.87 | 10.00 | 3.17 | 3.24 | 38.64 | 39.00 | 1171 |
| 9.57 | 9.00 | 1.06 | 10.63 | 10.00 | 3.18 | ...... | 3.18 | 3.00 | .75 | .82 | 21.38 | 23.00<br>22.50<br>20.00 | 320<br>178<br>620 |
| 9.25 | 9.00 | 1.47 | 10.72 | 10.00 | 2.13 | ...... | 2.13 | 2.00 | 1.21 | 1.23 | 22.20 | 28.00<br>.....<br>... | 319<br>175<br>800 |

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*Constituent falls below guaranty.
‡Guaranteed soluble phosphoric acid.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 768 | Patapsco Corn, Oats and Clover Compound. | John Harley, Thompsontown, ....... | 8.80 |
| 639 | Patapsco Early Trucker for Quick Growth, | Walter & Frederick, Montandon, ... | 7.38 |
| 1194 | †Patapsco Fish Guano, ..................... | Geo. W. Robinson, Allenwood, ..... | 8.13 |
| 1859 | | E. S. Brunner, New Bloomfield, .... | |
| 745 | †Patapsco Grain and Grass Producer, ... | W. B. Thom, Hdwr. Co., Tarentum, | 11.40 |
| 821 | | Russell Bros., Washington, ...... | |
| 1173 | | E. H. Meeker, Wilawana, .......... | |
| 618 | †Patapsco Potato Manure, ............... | E. S. Thomas, Gettysburg, .......... | 7.45 |
| 453 | | Wm. Hummer, Martin's Creek, ... | |
| 1147 | | Veith Bros., Ebensburg, ............ | |
| 1169 | Patapsco Premium Super Phosphate, ...... | Jas. McNamara, Cadis, .............. | 9.30 |
| 174 | Patapsco Tobacco and Potato Fertilizer,.. | Kramer & Son, Springboro, ........ | 10.08 |
| | PAN AMERICAN FERTILIZER CO., NEW YORK. | | |
| 1013 | Perkins Monarch Phosphate, ........... | Pan American Fert. Co., New York, | 6.68 |
| | PETER'S PACKING CO., McKEESPORT, PA. | | |
| 753 | Peter's 7-2-3 Producer, ...................... | Peter's Packing Co., McKeesport,... | 4.75 |
| 34 | Tube City Brand Animal Fertilizer,...... | T. E. Painter, Irwin, ................ | 7.73 |
| | J. D. PERKINS, COATESVILLE, PA. | | |
| 1013 | Perkins Monarch Phosphate, ............... | Edw. Tingley, New London, ........ | 6.98 |
| | PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. | | |
| 125 | †Insular Guano for all Crops, ............ | A. F. Stutzman & Co., Johnstown,.. | 4.13 |
| 1852 | | A. H. Ulsh, Millerstown, ........... | |
| 255 | †Piedmont Pennsylvania Grain Grower,.. | D. T. Stitzel, York Springs, ........ | 6.43 |
| 124 | | A. F. Stutzman & Co., Johnstown,. | |
| 370 | | Jas. Maust, Elk Lick, ............... | |
| 369 | †Piedmont Pennsylvania Potato Producer, | Jas. Maust, Elk Lick, ............... | 5.40 |
| 123 | | A. F. Stutzman & Co., Johnstown,... | |
| 885 | | M. G. Adams, Paximos, ............. | |
| 158 | †Piedmont Perfection Guano, ............ | D. F. Stitzel, York Springs, ....... | 8.70 |
| 350 | | B. F. Sheesley, Penbrook, ......... | |
| 1400 | Piedmont Success, .......................... | J. G. Simpson, Huntingdon, ......... | 5.35 |
| | PIONEER FERTILIZER CO., CLEVELAND, OHIO. | | |
| 18 | Pioneer 2-8-10 Fertilizer, .................... | Wm. H. Roadhouse, Greenville,...... | 11.23 |
| | PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA. | | |
| 307 | Lawn Fertilizer, .............................. | Scobie, Parker & Co., Pittsburgh, .. | 4.78 |
| 32 | Smith's Grower, .............................. | A. W. Smith Co., Pittsburgh, ...... | 1.57 |
| 2029 | Special Potato Fertilizer, ............... | Ira D. Reed, Moravia, ............... | 3.80 |
| | POLLOCK FERTILIZER CO., BALTIMORE, BY THE A. C. C. CO., NEW YORK. | | |
| 920 | Ammoniated Super Phosphate, .......... | Frances Baker, Everett, ............. | 9.43 |
| 1350 | | S. A. Barshinger, Red Lion, .......... | |
| 699 | †Crop Invigorator, ........................ | J. H. Kelly, Littlestown, .......... | 10.25 |
| 390 | | Jno. L. Bortz, Bedford, ............. | |
| 912 | | D. W. Diebert, Bedford, ............ | |
| 1007 | †Special Potato and Tobacco Fertilizer,. | Harvey Spencer, Cochranville, ...... | 9.35 |
| 395 | | J. L. Longenecker, Woodbury, ..... | |
| 908 | | L. W. Egolf, Schellsburg, .......... | |
| 1387 | †Special Wheat and Corn Fertilizer, ..... | Augustus Storr, Orbisonia, ........... | 9.63 |
| 696 | | J. H. Kelly, Littlestown, ........... | |
| 1849 | | E. C. Mengle, Liverpool, ........... | |
| | RAMSBURG FERTILIZER CO., THE. FREDERICK, MD. | | |
| 705 | Ammoniated Phosphate, ...... . .......... | Humber & Kreig, Littlestown, ...... | 12.00 |
| 707 | †Old Virginia Compound, ..... .......... | Humbert & Krieg, Littlestown, ..... | 9.95 |
| 1873 | | Franklin Miller & Son, Greencastle, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. Available. Found. | Phosphoric Acid in 100 Pounds. Available. Guaranteed. | Phosphoric Acid in 100 Pounds. Insoluble. | Phosphoric Acid in 100 Pounds. Total. Found. | Phosphoric Acid in 100 Pounds. Total. Guaranteed. | Potash in 100 Pounds. Present as muriate. | Potash in 100 Pounds. Present as sulphate. | Potash in 100 Pounds. Total. Found. | Potash in 100 Pounds. Total. Guaranteed. | Nitrogen in 100 lbs. Found. | Nitrogen in 100 lbs. Guaranteed. | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *9.41 | 10.00 | 1.04 | *10.45 | 11.00 | 6.00 | 2.18 | 8.13 | 8.00 | .53 | ...... | 22.89 | 19.50 | 768 |
| 7.63 | 7.00 | 1.29 | 8.92 | 8.00 | 5.61 | ...... | 5.61 | 5.00 | *3.89 | 4.11 | 36.30 | 35.00 | 689 |
| 7.80 | 6.00 | .97 | 8.77 | 7.00 | 2.44 | ...... | 2.44 | 2.00 | 1.62 | 1.65 | 22.60 | .....<br>22.00 | 1194<br>1859 |
| 8.59 | 8.00 | 1.48 | 10.07 | 9.00 | 4.29 | ...... | 4.29 | 4.00 | 1.09 | .82 | 23.28 | 24.00<br>28.00<br>24.00 | 745<br>821<br>1173 |
| 5.23 | 5.00 | 1 54 | 6.77 | 6.00 | 10.02 | ...... | 10.02 | 10.00 | 1.50 | 1.65 | 27.49 | 25.00<br>26.00<br>27.00 | 618<br>453<br>1147 |
| *7.15 | 8.00 | 2.68 | 9.83 | 9.00 | 11.14 | ...... | 11.14 | 10.00 | 1.61 | 1.65 | 31.66 | 28.66 | 1169 |
| 7.84 | 8.00 | 1.40 | 9.24 | 9.00 | 7.86 | ...... | 7.86 | 4.00 | 1.61 | 1.65 | 28.38 | 26.00 | 174 |
| *7.00 | 8.00 | 2.35 | 9.44 | 9.00 | 4.07 | ...... | 4.07 | 4.00 | 1.65 | 1.64 | 24.43 | ..... | 1518 |
| 8.91 | 7.00 | 4.87 | 13.78 | 12.50 | 2.62 | ...... | *2.62 | 3.00 | 3.78 | 2.00 | 35.84 | 28.00 | 753 |
| 9.45 | 7.00 | 4.18 | 13.63 | 13.00 | 2.00 | 2.15 | 4.15 | 4.00 | 3.75 | 3.00 | 37.90 | ..... | 84 |
| 10.02 | 10.00 | .89 | 10.91 | ...... | 5.96 | ...... | 5.96 | 5.00 | 1.37 | 1.23 | 27.26 | ..... | 1018 |
| 7.04 | 7.00 | .74 | 7.78 | ...... | 2.39 | ...... | 2.39 | 2.00 | .55 | .41 | 16.90 | 19.00<br>16.00 | 125<br>1852 |
| 7.41 | 7.00 | .89 | 8.30 | ...... | 4.93 | ...... | 4.93 | 5.00 | .94 | .82 | 21.76 | 18.00<br>24.00<br>..... | 255<br>124<br>370 |
| 6.70 | 6.00 | 1.36 | 8.06 | ...... | 10.36 | ...... | 10.36 | 10.00 | 1.46 | 1.65 | 29.06 | .....<br>30.00<br>26.00 | 369<br>123<br>885 |
| 8.58 | 8.00 | .66 | 9.24 | ...... | 5.80 | ...... | 5.80 | 5.00 | *1.30 | 1.65 | 25.33 | 20.00<br>28.00 | 158<br>850 |
| 8.85 | 9.00 | .73 | 9.58 | ...... | 4.72 | ...... | *4.72 | 5.00 | .71 | .21 | 21.78 | 18.00 | 1400 |
| 8.73 | 8.00 | .88 | 9.61 | 9.00 | 8.40 | 2.45 | 10.95 | 10.00 | 1.51 | 1.65 | 32.25 | 31.00 | 18 |
| 7.48 | 4.00 | 7.82 | *14.80 | 16.00 | 2.23 | ...... | 2.23 | 1.50 | *2.63 | 2.87 | 29.94 | 40.00 | 307 |
| 4.85 | ...... | ‡2.75 | 7.60 | ...... | 4.42 | ...... | *4.42 | 5.00 | 5.05 | 4.52 | 38.18 | ††300.00 | 32 |
| 10.58 | 9.00 | 1.93 | 12.51 | 10.00 | 3.06 | 4.17 | 7.23 | 7.00 | *1.34 | 1.64 | 30.68 | 28.00 | 2089 |
| 8.49 | 8.00 | 1.34 | 9.83 | 9.00 | 2.65 | ...... | 2.65 | 2.00 | 2.19 | 1.65 | 26.46 | 22.00<br>21.00 | 920<br>1350 |
| 8.61 | 8.00 | 1.22 | 9.83 | 9.00 | 4.23 | ...... | 4.23 | 4.00 | .85 | .82 | 21.96 | 19.00<br>22.00<br>21.00 | 699<br>390<br>912 |
| 8.18 | 8.00 | 1.31 | 9.47 | 9.00 | 4.41 | ..... | 4.41 | 4.00 | 1.76 | 1.65 | 25.78 | 24.00<br>25.00<br>22.00 | 1007<br>395<br>908 |
| 8.31 | 8.00 | 1.27 | 9.58 | 9.00 | 2.12 | ...... | 2.12 | 2.00 | .77 | .82 | 1909 | .....<br>17.00<br>18.00 | 1387<br>698<br>1849 |
| 10.86 | 10.00 | 3.19 | 14.05 | ...... | 2.44 | ...... | 2.44 | 2.00 | .81 | .82 | 23.14 | 18.00 | 705 |
| 10.22 | 8.00 | 2.36 | 12.58 | ...... | 4.25 | ...... | 4.25 | 4.00 | 1.06 | 1.00 | 25.10 | 20.00<br>19.00 | 707<br>1873 |

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*Constituent falls below guaranty.
††Fifteen cents per pound.
‡Guaranteed 5% insoluble.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | | |
| 371 | †Rasin's Empire Guano, | Chas. Oester, Elk Lick, | 7.80 |
| 1618 | | H. B. Low & Son, Orangeville, | |
| 209 | †Rasin's Genesee Valley Root Manure, | W. W. Book, Port Royal, | 10.08 |
| 112 | | Chas. Yaeckle, Patton, | |
| 1504 | | S. C. Walker & Co., Chadds Ford Junction. | |
| 168 | †Rasin's I. X. L. Fertilizer, | J. Wilson Hamilton, Meadville, | 10.55 |
| 188 | | C. B. McCormick, State College, | |
| 1311 | †Monumental Potato Manure, | J. D. Markle, Hanover, | 8.10 |
| 111 | | Chas. Yaeckle, Patton, | |
| 1619 | | H. B. Low & Son, Orangeville, | |
| 632 | †Rasin's National Crop Compound, | J. R. Weaver & Bro., New Oxford, | 12.30 |
| 203 | | W. W. Book, Port Royal, | |
| 956 | | Oliver Ullur, Tatamy, | |
| 211 | †Rasin's Royal Fish, Bone and Potash, | W. W. Book, Port Royal, | 9.60 |
| 169 | | J. Wilson Hamilton, Meadville, | |
| 585 | | Edw. D. Leibold, Sagersville, | |
| 212 | †Rasin's Vegetable Special, | W. W. Book, Port Royal, | 9.20 |
| 113 | | Chas. Yaeckle, Patton, | |
| 327 | | Dr. N. W. Troup, Elizabethville, | |
| 1227 | †Wm. Penn Crop Grower, | S. C. Walker & Co., Chadds Ford Junction. | 6.80 |
| 1506 | | Isaac Shirey, McClure, | |
| 206 | †Rasin's Wheat, Corn and Oats Mixture, | W. W. Book, Port Royal, | 9.70 |
| 68 | | L. A. Geiger, Joanna, | |
| 824 | | W. A. Porter, Cambridge Springs, | |
| 531 | †Rasin's X. X. X. Fertilizer, | Edw. D. Leibold, Sagersville, | 9.06 |
| 167 | | J. Wilson Hamilton, Meadville, | |
| 863 | | Elias S. Brubacker, Richland, | |
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 870 | Farmer's Tankage and Potash for Corn, Grain and Grass. | C. R. Bucher, Myerstown, | 7.75 |
| 386 | †Farmer's Union Fertilizer, | J. H. Moses, Osterburg, | 8.68 |
| 257 | | S. B. Alcott, Ursina, | |
| 432 | | M. B. Hickman, West Chester, | |
| 893 | †Gilt Edge Potato and Tobacco Grower, | Chas. Poke, Catawissa, | 8.65 |
| 614 | | Jacob Meck, Meckville, | |
| 982 | | A. K. Kulp, Pottstown, | |
| 288 | †Never Fail Crop Grower, | Emma Wenger, Jonestown, | 9.30 |
| 608 | | Jacob D. Moyer, Bechtelsville, | |
| 9 | Reading Prize Winner, | R. W. Ferguson, Jersey Shore, | 10.33 |
| 110 | Reading Special Potato and Tobacco Manure. | A. F. Bauer, Hamburg, | 7.03 |
| 600 | †Sterling Potato Grower, | Jno. W. Slipp, Birdsboro, | 9.06 |
| 555 | | Harvey Buss, Allentown, | |
| 1397 | | S. T. Smith, Mill Creek, | |
| 1490 | †Tobacco and Truck Special, | Equity Cooperation Co., Covington, | 6.08 |
| 1985 | | B. H. Hershey, Manheim, | |
| | ROBERT A. REICHARD, ALLENTOWN, PA. | | |
| 514 | Golden Harvest Phosphate, | Jno. Eisenhart, Macungie, | 4.90 |
| 515 | †Lehigh Potato Manure, | Jno. Eisenhart, Macungie, | 7.58 |
| 958 | | E. J. Gerlauch, Bethlehem, | |
| 563 | †Peerless Phosphate, | Weston Kern, Emerald, | 5.88 |
| 959 | †Trucker's Favorite, | E. J. Gerlauch, Bethlehem, | 5.48 |
| 517 | | Jno. Eisenhart, Macungie, | |
| 957 | | E. J. Gerlauch, Bethlehem, | |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 1069 | Royster's Big Chief Tobacco Guano, | A. W. & J. H. Mentzer, Ephrata, | 5.80 |
| 538 | †Royster's Big Yield Potato Producer, | Amandes Wootring, Schnecksville, | 4.45 |
| 491 | | C. E. Drake, Athens, | |
| 1107 | | L. K. Gruber, Reinholds, | |
| 539 | †Royster's Challenge Complete Compound, | Amandes Wootring, Schnecksville, | 7.88 |
| 1488 | | J. D. Morris, Covington, | |
| 1092 | †Royster's Champion Crop Compound, | A. W. & I. H. Mentzer, Ephrata, | 7.53 |
| 1932 | | Geo. K. Watson, Embreville, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.57 | 8.00 | 1.76 | 10.33 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 2.08 | 1.65 | 25.65 | .....<br>20.00 | 371<br>1618 |
| 8.56 | 8.00 | 1.95 | 10.51 | 9.00 | 9.46 | 1.41 | 10.87 | 10.00 | .76 | .82 | 28.88 | 26.00<br>22.50 | 209<br>112 |
| 9.48 | 9.00 | 3.10 | 12.58 | 10.00 | 3.16 | ...... | 3.16 | 3.00 | 1.06 | .82 | 23.59 | 26.00<br>21.00<br>19.50 | 1504<br>168<br>188 |
| 6.05 | 6.00 | 2.77 | 8.82 | 7.00 | 7.71 | ...... | 7.71 | 7.00 | 1.46 | 1.65 | 26.36 | 25.00<br>23.00<br>24.00 | 1311<br>111<br>1619 |
| 9.27 | 8.00 | 2.78 | 12.05 | 9.00 | 4.25 | ...... | 4.25 | 4.00 | .81 | .82 | 23.16 | 18.00<br>21.00<br>..... | 632<br>208<br>956 |
| 8.27 | 8.00 | 3.51 | 11.78 | 9.00 | 3.33 | .11 | 3.44 | 3.00 | 1.51 | 1.65 | 24.94 | 23.00<br>23.00<br>21.00 | 211<br>169<br>535 |
| 8.01 | 8.00 | 2.93 | 10.94 | 9.00 | 4.00 | 5.86 | 9.86 | 10.00 | 1.46 | 1.65 | 32.04 | 28.00<br>26.00<br>25.00 | 212<br>113<br>327 |
| 9.69 | 8.00 | 1.98 | 11.62 | 9.00 | .99 | ...... | .99 | 1.00 | .86 | .82 | 20.11 | 17.50<br>20.00 | 1227<br>1506 |
| 8.47 | 8.00 | 1.87 | 10.34 | 9.00 | 1.84 | ...... | 1.84 | 2.00 | .43 | .41 | 15.13 | 17.00<br>15.00<br>18.75 | 206<br>68<br>824 |
| 8.48 | 8.00 | 2.93 | 11.41 | 9.00 | 4.40 | .98 | 5.38 | 5.00 | *1.43 | 1.65 | 26.79 | 22.00<br>24.00<br>23.84 | 534<br>167<br>860 |
| *7.32 | 8.00 | 2.36 | 9.68 | 9.00 | 4.31 | ...... | 4.31 | 4.00 | .81 | .82 | 21.07 | 19.50 | 870 |
| 8.69 | 8.00 | 1.90 | 10.59 | 9.00 | 9.26 | ...... | 9.26 | 8.00 | *1.42 | 1.64 | 30.01 | 28.00<br>36.00<br>27.00 | 386<br>351<br>432 |
| 7.10 | 7.00 | 2.86 | 9.96 | 8.00 | 8.66 | 2.52 | 11.18 | 10.00 | 1.68 | 1.64 | 32.58 | 26.00<br>26.00<br>31.00 | 893<br>614<br>982 |
| *7.74 | 8.00 | 2.85 | 10.59 | 9.00 | 1.53 | ...... | 1.53 | 1.00 | .86 | .82 | 19.14 | 18.00<br>20.00 | 288<br>608 |
| 9.85 | 9.00 | .96 | 10.81 | 10.00 | 8.40 | 3.45 | 11.85 | 12.00 | *2.13 | 2.46 | 37.64 | 37.00 | 9 |
| 6.46 | 6.00 | 2.37 | 8.83 | 7.00 | 6.70 | ...... | *6.70 | 7.00 | .77 | .82 | 22.42 | 24.00 | 110 |
| 8.43 | 8.00 | .91 | 9.3· | 9.00 | 10.95 | ...... | 10.95 | 10.00 | .86 | .82 | 28.50 | 30.00<br>.....<br>26.50 | 600<br>555<br>1397 |
| 6.41 | 6.00 | 1.49 | 7.90 | 7.00 | 6.58 | ...... | 6.58 | 6.00 | 2.53 | 2.46 | 30.01 | 29.00<br>29.00 | 1490<br>1985 |
| *7.19 | 8.00 | 2.52 | *9.71 | 10.00 | 5.65 | ...... | 5.65 | 5.00 | *1.44 | 1.64 | 25.32 | 23.75 | 514 |
| 8.09 | 8.00 | 1.25 | *9.34 | 10.00 | 10.73 | ...... | 10.73 | 10.00 | 1.62 | 1.64 | 31.53 | 28.50<br>32.00 | 515<br>958 |
| 7.99 | 8.00 | 1.28 | *9.27 | 9.50 | 4.62 | ...... | 4.62 | 4.00 | .81 | .82 | 21.50 | 20.00 | 566 |
| 6.84 | 6.00 | 1.05 | 7.89 | 7.50 | 8.35 | ...... | 8.35 | 8.00 | 3.20 | 3.28 | 35.00 | 22.00<br>34.50<br>36.00 | 959<br>513<br>957 |
| 8.18 | 8.00 | 1.66 | 9.84 | 8.50 | 2.80 | 6.37 | *9.17 | 10.00 | 2.06 | 1.65 | 33.76 | 29.00 | 1089 |
| 5.26 | 5.00 | 1.45 | 6.71 | 5.50 | 4.93 | 5.28 | 10.21 | 10.00 | 1.66 | 1.65 | 29.64 | 25.00<br>28.00<br>27.00 | 538<br>491<br>1107 |
| 7.95 | 8.00 | 1.38 | 9.33 | 8.50 | 5.06 | .39 | *5.45 | 6.00 | 1.58 | 1.65 | 26.13 | 24.00 | 539 |
| 8.15 | 8.00 | 1.68 | 9.83 | 8.50 | 4.54 | ...... | 4.54 | 4.00 | 1.65 | 1.65 | 25.70 | 25.75<br>22.50<br>24.00 | 1488<br>1092<br>1932 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 134 | Royster's Complete Potato Manure, | Abraham Hostetler, Johnstown, | 7.88 |
| 659 | †Royster's Farmer's Delight Fertilizer, | Dan. L. Latsha, Red Cross, | 6.23 |
| 1383 | | Huston Bros., Three Springs, | |
| 1352 | †Royster's Fish, Flesh and Fowl, | G. B. Murphy, Red Lion, | 7.30 |
| 540 | | Amandes Wootring, Schnecksville, | |
| 1636 | | Homer Woodringer, Walnutport, | |
| 1651 | Royster's General Crop Fertilizer, | McCauley, McKay & Co., Brockwayville. | 4.78 |
| 587 | †Royster's Gold Seal Potato Special, | Amandes Wootring, Schnecksville, | 7.55 |
| 364 | | H. L. Tike, Meyersdale, | |
| 660 | | Dan. L. Latsha, Red Cross, | |
| 1185 | †Royster's Harvest King Fertilizer, | Preston Bros., Troy, | 7.70 |
| 657 | | Dan. L. Latsha, Red Cross, | |
| 1763 | | J. J. Barnhardt, Harmony, | |
| 1414 | Royster's Hay and Grain Fertilizer, | Reynoldsville Hardware Co., Reynoldsville. | 6.88 |
| 362 | †Royster's Lehigh Potato Grower, | H. L. Tike, Meyersdale, | 7.50 |
| 248 | | J. L. Ditzler, Milton, | |
| 1924 | | H. A. Mendenhall, Toughkenamon, | |
| 969 | Royer's Practical Truck Guano, | S. A. Phillippy, Schaefferstown, | 8.83 |
| 1044 | †Royster's Prolific Potato Producer, | O. P. Beebe, Montrose, | 5.98 |
| 567 | | Abraham Hostetler, Johnstown, | |
| 1669 | | Jno. A. McKee & Son, Clarion, | |
| 1033 | Royster's Seeding Down Special Fertilizer, | B. J. Dougherty, Meshoppen, | 8.78 |
| 179 | Hostetler's Special Fruit and Truck Mixture. | Abraham Hostetler, Johnstown, | 7.05 |
| 982 | | Weaver & Berkey, Windber, | |
| 1700 | Royster's Trucker's Favorite, | R. J. Dunham, Wellsboro, | 4.35 |
| 830 | Royster's Universal Crop Grower, | N. C. Creasy, Catawissa, | 5.00 |
| 708 | †Royster's Wheat, Oats and Barley Fertilizer. | Humbert & King, Littlestown, | 7.83 |
| 492 | | C. E. Drake, Athens, | |
| 883 | | N. C. Creasy, Catawissa, | |
| | SCHALL-SHELDON FERTILIZER CO., BUFFALO, N. Y. | | |
| 1903 | Schaal's Corn and Potash, | Harry C. Shirk, Centre Hall, | 2.00 |
| 828 | Guano, | Brooklyn Milling Co., Spartansburg, | 10.50 |
| 21 | Schaal's Standard, | J. W. Morrison, Transfer, | 10.10 |
| 1905 | Trucker's Manure, | Harry C. Shirk, Centre Hall, | 3.20 |
| | SCOTT'S FERTILIZER CO., THE, ELKTON, MD. | | |
| 283 | †Scott's Corn and Oats Grower, | E. D. Houser, Grantville, | 6.50 |
| 84 | | Levi Beiler, Elverson, | |
| 1942 | | Wm. C. Halbrook, Ercildown, | |
| 285 | †Scott's Potato and Truck Special, | E. D. Houser, Grantville, | 8.85 |
| 85 | | Levi Beiler, Elverson, | |
| 523 | | Wm. H. Hoffman, New Tripoli, | |
| 284 | †Scott's Potato Grower, | E. D. Houser, Grantville, | 7.45 |
| 83 | | Levi Beiler, Elverson, | |
| 522 | | Wm. H. Hoffman, New Tripoli, | |
| 858 | †Scott's Sure Growth Compound, | Elias S. Brubacher, Richlands, | 9.98 |
| 1529 | | S. T. Erwin, Somerton, | |
| 1094 | Scott's Sure Growth Super Phosphate, | M. R. Royer, Ephrata, | 7.98 |
| | M. L. SHOEMAKER & CO., PHILADELPHIA, PA. | | |
| 49 | Echo Super Phosphate, | Chester A. Snyder, Weissport, | 8.14 |
| 51 | Twenty-Three Dollar Super Phosphate, | A. B. Weisel, Quakertown, | 6.08 |
| 989 | †Shoemaker's Swift Sure Guano for Tomatoes, Truck and Corn. | H. S. Beidler, Doylestown, | 9.23 |
| 81 | | L. A. Geiger, Joanna, | |
| 1768 | | J. C. Wyman, Dallas, | |
| 411 | Shoemaker's New Jersey Special for Oats, | Jas. K. Lewis, Honeybrook, | 5.48 |
| 101 | †Shoemaker's Special 10% Potato Fertilizer No. 1. | Stephen M. Stoltzfus, Morgantown, | 8.81 |
| 1525 | | W. E. Erwin, Somerton, | |
| 100 | Shoemaker's Special 10% Potato Fertilizer, No. 2. | Stephen M. Stoltzfus, Morgantown, | 8.13 |
| 1017 | Swift Sure Super Phosphate for General Use. | W. E. Erwin, Somerton, | 6.85 |
| 601 | †Swift Sure Super Phosphate for Potatoes. | Charles Geiger, Scharlets Mills, | 7.60 |
| 360 | | Mr. Kuntz, Tricklers, | |
| 99 | Swift Sure Super Phosphate for Tobacco, | Stephen M. Stolzfus, Morgantown, | .... |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2.000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.29 | 6.00 | 1.66 | 7.95 | 6.50 | 11.59 | ...... | 11.59 | 10.00 | 3.44 | 3.29 | 39.21 | 32.00 | 134 |
| 8.13 | 8.00 | 1.24 | 9.87 | 8.50 | 2.13 | ...... | 2.13 | 2.00 | .48 | .41 | 15.16 | 17.00<br>12.40 | 659<br>1383 |
| 8.15 | 8.00 | 1.23 | 9.43 | 8.50 | 3.61 | ...... | 3.61 | 3.00 | 1.69 | 1.65 | 24.76 | 21.00<br>22.00<br>20.00 | 1352<br>540<br>1636 |
| 8.97 | 8.00 | 1.50 | 10.47 | 8.50 | 6.63 | ...... | 6.63 | 5.00 | 1.63 | .82 | 28.56 | 22.00 | 1651 |
| 7.87 | 8.00 | 2.08 | 9.95 | 8.50 | 8.66 | 1.69 | 10.35 | 10.00 | 1.54 | 1.65 | 31.45 | 27.00<br>26.45<br>28.00 | 573<br>364<br>660 |
| *7.49 | 8.00 | 1.92 | 9.41 | 8.50 | 3.03 | ...... | 3.03 | 2.00 | 1.62 | 1.65 | 23.37 | 22.50<br>23.50<br>24.00 | 1185<br>657<br>1763 |
| *8.88 | 10.00 | 2.59 | 11.47 | 10.50 | 10.13 | .33 | 10.46 | 10.00 | 1.70 | 1.65 | 33.16 | 31.00 | 1414 |
| 7.10 | 7.00 | 1.57 | 8.67 | 7.50 | 10.80 | 3.37 | *14.17 | 15.00 | 1.13 | .82 | 32.88 | 26.60<br>26.00<br>30.00 | 363<br>248<br>1924 |
| 8.01 | 8.00 | 1.72 | 9.73 | 8.50 | 6.27 | ...... | 6.27 | 6.00 | 2.34 | 2.47 | 30.51 | 28.50 | 869 |
| 6.49 | 6.00 | 1.59 | 8.08 | 6.50 | 4.13 | 1.09 | 5.22 | 5.00 | 1.77 | 1.23 | 25.36 | 25.00<br>22.00<br>26.00 | 1044<br>567<br>1669 |
| 9.39 | 9.00 | .87 | 10.26 | 9.50 | 3.09 | ...... | 3.09 | 3.00 | .82 | .82 | 21.21 | 23.00 | 1033 |
| *6.93 | 7.25 | 9.32 | 16.25 | 16.00 | 5.33 | 2.76 | 8.09 | 8.00 | 2.16 | 1.85 | 34.69 | 31.00<br>31.00 | 129<br>932 |
| 8.06 | 8.00 | 2.11 | 10.17 | 8.50 | 5.82 | ...... | 5.82 | 5.00 | 5.15 | 4.94 | 43.02 | 40.00 | 1700 |
| *6.39 | 7.00 | 2.07 | 8.46 | 7.50 | 1.20 | ...... | 1.20 | 1.00 | 1.01 | .82 | 17.70 | 18.00 | 890 |
| 7.94 | 8.00 | 1.28 | 9.22 | 8.50 | 2.00 | .33 | 2.33 | 2.00 | 1.01 | .82 | 20.16 | 17.00<br>21.00<br>19.00 | 708<br>492<br>889 |
| 8.01 | 8.00 | 2.41 | 10.42 | 9.00 | 4.62 | ...... | 4.62 | 4.00 | 1.60 | 1.65 | 25.70 | 24.00 | 1906 |
| 8.41 | 8.00 | .95 | 9.36 | 9.00 | 4.17 | ...... | 4.17 | 4.00 | .86 | .82 | 21.54 | 23.00 | 828 |
| *7.06 | 8.00 | 2.42 | 9.48 | 9.00 | 2.43 | ...... | 2.43 | 2.00 | 1.80 | 1.65 | 23.50 | 21.65 | 21 |
| 9.24 | 8.00 | 1.30 | 10.54 | 9.00 | 8.19 | ...... | 8.19 | 6.00 | 2.29 | 2.47 | 33.31 | 30.00 | 1905 |
| 8.08 | 8.00 | 1.68 | 9.76 | ...... | 3.26 | ...... | 3.26 | 2.00 | .81 | .41 | 20.42 | 15.50<br>14.95<br>17.00 | 286<br>84<br>1942 |
| 9.50 | 7.00 | 1.63 | 11.13 | ...... | 5.40 | ...... | 5.40 | 5.00 | *1.31 | 1.65 | 26.32 | 22.00<br>21.50<br>26.00 | 285<br>85<br>523 |
| 8.79 | 6.00 | 1.68 | 10.47 | ...... | 7.20 | 2.89 | 10.09 | 10.00 | 1.86 | 1.65 | 33.63 | 24.50<br>24.50<br>27.00 | 284<br>83<br>522 |
| 7.54 | 7.00 | .98 | 8.52 | ...... | 7.41 | ...... | 7.41 | 7.00 | 3.21 | 3.30 | 34.70 | 32.00<br>36.00 | 858<br>1529 |
| 9.26 | 8.00 | 1.76 | 11.02 | ...... | 3.75 | ...... | 3.75 | 3.00 | 1.70 | 1.65 | 26.25 | 24.00 | 1094 |
| 10.00 | 7.00 | 3.77 | 13.77 | 10.00 | 2.68 | ...... | 2.68 | 1.50 | 1.61 | 1.23 | 26.45 | 20.50 | 49 |
| 8.29 | 6.00 | 3.44 | 11.73 | 9.00 | 2.44 | ...... | 2.44 | 1.25 | 1.19 | 1.03 | 22.50 | ..... | 51 |
| 9.04 | 8.00 | 2.87 | 11.91 | 10.00 | 3.60 | 2.51 | 6.11 | 5.00 | 2.09 | 1.65 | 31.40 | 26.00<br>24.00<br>24.00 | 989<br>81<br>1768 |
| 9.29 | 8.00 | 3.70 | 12.99 | 11.00 | 2.50 | ...... | 2.50 | 2.00 | 1.54 | .82 | 25.29 | 21.00 | 441 |
| 8.16 | 6.00 | 2.09 | 10.25 | 8.00 | 2.80 | 6.30 | *9.10 | 10.00 | *3.16 | 3.30 | 38.89 | 32.00<br>34.00 | 101<br>1528 |
| 9.41 | 8.00 | 2.22 | 11.63 | 10.00 | 5.86 | 5.67 | 11.53 | 10.00 | 1.81 | 1.65 | 36.43 | 27.00 | 100 |
| 10.26 | 9.00 | 4.12 | 14.38 | 12.00 | 5.36 | ...... | 5.36 | 4.50 | 2.72 | 2.88 | 34.65 | 30.00 | 1017 |
| 9.48 | 8.00 | 3.78 | 13.26 | 11.00 | 6.66 | .78 | 7.44 | 7.00 | 2.77 | 2.88 | 36.19 | .....<br>29.00 | 601<br>960 |
| 10.04 | 8.00 | 2.58 | 12.62 | 11.00 | .66 | 4.93 | 5.59 | 4.50 | 2.92 | 2.88 | 36.02 | 31.00 | 99 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | SMITH AGRICULTURAL CHEMICAL CO., THE, COLUMBUS, OHIO. | | |
| 177 | Ohio Farmer's Ammoniated Phosphate and and Potash. | C. R. Forbes, Albion, | 7.96 |
| 178 | Ohio Farmer's Corn, Oats and Wheat Fertilizer. | C. R. Forbes, Albion, | 8.23 |
| 15 | Ohio Farmer's Potato and Tobacco Special. | N. P. Hayes, Edinboro, | 6.92 |
| 14 | †Ohio Farmer's Wheat Maker and Seeding Down. | N. P. Hayes, Edinboro, | 6.78 |
| 17 | | Geo. J. Abbey, West Springfield, | |
| | SOUTHERN FERTILIZING CO., YORK, PA. | | |
| 526 | †Southern Fertilizing Co. Potato, Truck and Tobacco Fertilizer. | Henry Weaver, New Tripoli, | 8.45 |
| 1305 | | J. H. Koller, Mechanicsburg, | |
| 527 | Southern Fertilizing Co. Wheat, Corn and Grass Grower. | Henry Weaver, New Tripoli, | 7.06 |
| | SWACK'S FERTILIZER WORKS, DUBOIS, PA. | | |
| 2235 | Swack's General Crop Grower, | J. W. Moore's Farm, Corsica, | 10.38 |
| 2120 | Swack's Grain and Corn Fertilizer, | G. A. Towns, Penfield, | 5.65 |
| | SWIFT & COMPANY, BALTIMORE, MD. | | |
| 1249 | Swift's Pure Diamond E. Fertilizer, | Jas. Guldner, Tamaqua, | 7.08 |
| 1380 | †Swift's Pure Diamond C. Fertilizer, | J. P. Kocker, Wrightsville, | 7.30 |
| 738 | | J. Osterling & Son, Butler, | |
| 1568 | | H. W. Siegrist, Gap, | |
| 1250 | †Swift's Pure Early Potato and Vegetable Grower. | Jas. Guldner, Tamaqua, | 5.83 |
| 1087 | | B. F. Zook, Ephrata, | |
| 1366 | | Jas Fulton Sons Co., Stewartstown, | |
| 1379 | Golden Grain Grower, | J. P. Shugart, New Freedom, | 6.70 |
| 1630 | †Swift's Pure Onion, Potato and Tobacco, | Kemmerer Hdw. Co., Lehighton, | 7.58 |
| 1495 | | H. B. Lewis, Mansfield, | |
| 1729 | | Jas. McCullough, Kittanning, | |
| 1061 | Swift's Pure Super Phosphate, | W. J. Kennedy Hdw. Co., Mars, | 5.63 |
| 1381 | †Swift's Pure Diamond A Fertilizer, | M. P. Kocher, Wrightsville, | 6.53 |
| 1531 | | A. M. Moyer, Trevose, | |
| 737 | †Swift's Pure Potato, Celery and Onion Grower. | P. J. Oslerling & Son, Butler, | 5.93 |
| 142 | | Cook & Co., Dillsburg, | |
| 1096 | | J. H. Reitz, Millway, | |
| 814 | †Swift's Pure Grain Fertilizer, | W. P. Rouse & Son, North East, | 7.85 |
| 826 | | P. J. Osterling & Son, Butler, | |
| 1062 | | W. J. Kennedy Hdw. Co., Mars, | |
| 325 | †Swift's Pure Truck Grower, | P. J. Osterling & Son, Butler, | 7.00 |
| 145 | | Cook & Co., Dillsburg, | |
| 1097 | | J. H. Reitz, Millway, | |
| 1496 | †Swift's Pure Red Steer Fertilizer, | H. B. Lewis, Mansfield, | 6.08 |
| 144 | | Cook & Co., Dillsburg, | |
| 1973 | | Graham Watts, Honesdale, | |
| | J. M. TEMPLIN, HONEY BROOK, PA. | | |
| 64 | No. 4 Atlds Brand Fertilizer, | Billed to Wm. Delp, Wernersville, | 11.20 |
| 63 | No. 8 High Grade Potash Manure, | Billed to Wm. Delp, Wernersville, | 9.40 |
| | I. P. THOMAS & SONS CO., PHILADELPHIA, PA. | | |
| 1060 | †Normal Phosphate, | Morrow & Buxton, Valencia, | 9.05 |
| 1348 | | T. H. Knisely, Red Lion, | |
| 530 | †Potato Fertilizer, | Philip Noll, Millersburg, | 8.88 |
| 106 | | B. M. Stoltzfus, Elverson, | |
| 795 | | Jno. T. Grubb, Mifflinburg, | |
| 104 | †Thomas' Scientific Tobacco Grower, | B. M. Stoltzfus, Elverson, | 7.85 |
| 868 | | Monroe A. Weitz, Kleinfeltersville, | |
| 447 | †Special Potato Manure, | H. C. Stahl, Martins Creek, | 7.33 |
| 279 | | Ed. Shuey, Lickdale, | |
| 651 | | Nelson Wilkinson, Paxinos, | |
| 53 | Trucker's High Grade Guano, | M. J. Dillon, Jarrettown, | 8.28 |
| 647 | †Victor Potash Manure, | Frances Kerstettor, Sunbury, | 8.73 |
| 261 | | John W. King, York Springs, | |
| 676 | | Wysox Coal and Hay Co., Wysox, | |
| 1347 | †Thomas' Wheat and Corn Fertilizer, | T. H. Knisely, Red Lion, | 12.03 |
| 1269 | | E. S. Risser, Palmyra, | |
| 1520 | | Theo. M. Griffith & Son, Downingtown. | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.36 | 8.00 | 1.47 | 9.83 | ...... | 4.00 | ...... | 4.00 | 4.00 | .88 | .82 | 21.85 | 24.00 | 177 |
| 8.26 | 8.00 | 2.17 | 10.43 | ...... | 2.52 | ...... | 2.52 | 2.00 | 1.62 | 1.64 | 23.76 | 24.00 | 178 |
| 8.14 | 8.00 | 1.03 | 9.17 | ...... | 5.43 | ...... | 5.43 | 4.00 | 1.60 | 1.64 | 26.07 | 27.00 | 15 |
| 9.69 | 8.00 | 1.13 | 10.82 | ...... | 2.52 | ...... | 2.52 | 2.00 | .98 | .82 | 21.94 | 23.00<br>23.50 | 14<br>17 |
| 8.67 | 8.00 | .87 | 9.54 | 9.00 | 9.16 | ...... | *9.16 | 10.00 | 1.78 | 1.65 | 31.23 | .....<br>26.00 | 526<br>1305 |
| 8.62 | 8.00 | 1.66 | 10.28 | 9.00 | 2.46 | ...... | 2.46 | 2.00 | 1.62 | 1.65 | 23.80 | .... | 527 |
| 7.95 | 8.00 | .44 | *8.39 | 9.00 | 4.24 | ...... | 4.24 | 4.00 | *.60 | .85 | 19.80 | 17.00 | 2235 |
| 7.07 | 7.00 | 1.74 | 8.81 | 9.00 | 3.03 | ...... | 3.03 | 3.00 | 1.32 | 1.50 | 21.46 | 25.00 | 2120 |
| *7.78 | 8.00 | .83 | *8.61 | 9.00 | 7.98 | ...... | 7.98 | 7.00 | 3.32 | 3.29 | 35.95 | 32.00 | 1249 |
| *7.55 | 8.00 | 1.36 | 8.91 | 9.00 | 4.00 | ...... | 4.00 | 4.00 | 1.58 | 1.65 | 24.18 | 21.00<br>25.50<br>21.37 | 1380<br>738<br>1568 |
| 6.26 | 6.00 | .83 | 7.09 | 7.00 | 8.80 | 1.31 | 10.11 | 10.00 | 3.10 | 3.29 | 35.94 | 32.00<br>32.00<br>32.00 | 1250<br>1087<br>1366 |
| 8.39 | 8.00 | .51 | 8.90 | 9.00 | 5.77 | ...... | 5.77 | 5.00 | 1.53 | 1.65 | 26.14 | 22.00 | 1879 |
| 8.17 | 7.00 | 1.22 | 9.39 | 8.00 | 7.45 | ...... | 7.45 | 7.00 | 1.64 | 1.65 | 28.46 | 26.00<br>27.46<br>28.50 | 1630<br>1495<br>1729 |
| 7.91 | 8.00 | 1.63 | 9.54 | 9.00 | 2.08 | ...... | 2.08 | 2.00 | 1.60 | 1.65 | 22.70 | 24.00 | 1061 |
| 8.02 | 8.00 | .83 | 8.85 | 9.00 | 3.54 | ...... | 3.54 | 3.00 | 2.38 | 2.47 | 27.54 | 23.00<br>23.00 | 1381<br>1531 |
| 5.10 | 5.00 | .57 | 5.67 | 5.50 | 9.88 | ...... | 9.88 | 10.00 | .78 | .82 | 23.62 | 27.00<br>21.80<br>23.00 | 737<br>143<br>1096 |
| 8.39 | 8.00 | 1.15 | 9.54 | 8.50 | 2.17 | ...... | 2.17 | 2.00 | .91 | .82 | 19.82 | 20.00<br>20.15<br>23.00 | 814<br>326<br>1062 |
| 7.88 | 8.00 | 1.28 | 9.16 | 8.50 | 4.23 | ...... | 4.23 | 4.00 | .84 | .82 | 21.24 | 23.00<br>19.00<br>22.00 | 325<br>145<br>1097 |
| 8.22 | 8.00 | 1.06 | 9.28 | 9.00 | 2.29 | ...... | 2.29 | 2.00 | 1.61 | 1.65 | 22.96 | 23.75<br>20.43<br>23.50 | 1496<br>144<br>1978 |
| 10.72 | 10.00 | 1.66 | 12.38 | 11.00 | .53 | 3.72 | 4.25 | 4.00 | 1.86 | 1.65 | 29.83 | ..... | 64 |
| 11.11 | 11.00 | 1.17 | 12.28 | 12.00 | 2.26 | 5.55 | 7.81 | 8.00 | .82 | .82 | 29.26 | ..... | 63 |
| 8.78 | 8.50 | 1.10 | 9.88 | 9.00 | 2.69 | ...... | 2.69 | 1.50 | 1.21 | 1.00 | 22.14 | 23.50<br>18.00 | 1060<br>1348 |
| 9.37 | 9.00 | 1.02 | 10.39 | 10.00 | 6.31 | ...... | 6.31 | 6.00 | *1.16 | 1.64 | 26.14 | 25.00<br>28.00<br>24.00 | 330<br>106<br>795 |
| 8.65 | 8.00 | 1.10 | 9.75 | 9.00 | 1.33 | 4.88 | 6.21 | 6.00 | 2.36 | 2.46 | 31.95 | 30.00<br>31.75 | 104<br>868 |
| 7.79 | 7.00 | .47 | 8.26 | 8.00 | 10.00 | 1.18 | 11.18 | 10.00 | 1.83 | 1.64 | 32.72 | 28.00<br>27.50<br>..... | 447<br>279<br>651 |
| 7.50 | 7.00 | .60 | 8.10 | 8.00 | 4.20 | 4.07 | 8.27 | 7.00 | 3.24 | 3.29 | 36.56 | 33.00 | 53 |
| 7.98 | 8.00 | 1.01 | 8.99 | 9.00 | 5.45 | ...... | 5.45 | 5.00 | .95 | .82 | 22.93 | 21.50<br>20.00<br>21.00 | 647<br>261<br>676 |
| 9.38 | 9.00 | 1.06 | 10.44 | 10.00 | 3.92 | ...... | 3.92 | 3.00 | .86 | .82 | 22.35 | 19.00<br>19.00<br>22.00 | 1347<br>1269<br>1520 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | JAMES THOMAS, WILLIAMSPORT, PA. | | |
| 1410 | †Thomas' Klondike Brand Phosphate, | Keystone Hdw. Co., Reynoldsville, | 9.28 |
| 1474 | | Thos. Green, Canton, | |
| 1188 | †Thomas' Potato and Truck Manure, | F. E. Shoemaker, Granville Summit, | 7.78 |
| 1411 | | Keystone Hdw. Co., Reynoldsville, | |
| 1439 | Thomas' Standard Brand Phosphate, | Thos. Green, Canton, | 12.53 |
| | TRENTON BONE FERTILIZER CO., TRENTON, N. J. | | |
| 429 | Trenton Corn Mixture, | L. A. Howells, Morrisville, | 4.55 |
| 427 | Trenton High Grade Potato Fertilizer, | L. A. Howells, Morrisville, | 4.53 |
| 426 | Farmer's High Grade Potato Fertilizer, | L. A. Howells, Morrisville, | 4.28 |
| 428 | Trenton Keystone Potato Manure, | L. A. Howells, Morrisville, | 5.40 |
| 1019 | Trenton Tomato and Truck Fertilizer, | Hobersack Bros., Ivyland, | 8.18 |
| 430 | Trenton Potato Manure, | L. A. Howells, Morrisville, | 7.78 |
| | JACOB TRINLEY & SONS, LINFIELD, PA. | | |
| 1935 | Ravene Phosphate for All Crops, | Isaac A. Hartman, Anselmia, | 8.81 |
| | F. W. TUNNELL & CO., INC., PHILADELPHIA, PA. | | |
| 1006 | †Ammoniated Phosphate and Potash, | R. B. Jackson, Cochranville, | 7.98 |
| 2001 | | H. C. Breckbill, Strasburg, | |
| 1547 | Empire Potato Manure, | F. W. Tunnell & Co., Phila., | 9.15 |
| 434 | †No. 1 Special High Grade Potato Manure | Ed. Brinton & Sons, West Chester, | 7.83 |
| 516 | | Wm. Gehman, Macungie, | |
| 1925 | Royal Fish Guano, | H. A. Mendenhall, Toughkeneman, | 7.33 |
| 1524 | 7% Guano, | J. B. Sattherwaite, Woodburne, | 5.25 |
| 1523 | Special High Grade Potato Manure, | J. B. Sattherwaite, Woodburne, | 6.63 |
| 1995 | Sweet and White Potato Manure, | R. B. Jackson, Cochranville, | 6.73 |
| 1003 | Trucker's High Grade Fish Guano, | R. B. Jackson, Cochranville, | 9.63 |
| | TUSCORORA FERTILIZER CO., BALTIMORE, MD. | | |
| 253 | †Fruit and Potato, | I. A. Eschbach, Milton, | 8.53 |
| 814 | | R. C. Garber, Washington, | |
| 252 | York State Special, | I. A. Eschbach, Milton, | 6.25 |
| | J. E. TYGERT & CO., PHILADELPHIA, PA., BY THE A. A. C. CO., NEW YORK. | | |
| 1954 | Ammoniated Super Phosphate, | M. C. Michener, Media, | 7.95 |
| 1602 | Early Truck Guano, | Geo. S. Miller, Mifflinville, | 8.15 |
| 1953 | Gold Edge Potato Guano, | M. C. Michener, Media, | 6.08 |
| 1794 | Golden Harvest Phosphate, | Mandon Sechler, Orwigsburg, | 8.65 |
| 1795 | Potato Fertilizer, | Mandon Sechler, Orwigsburg, | 3.65 |
| 1955 | Potato Special, | M. C. Michener, Media, | 5.78 |
| 1584 | Ten Per Cent. Grain Grower, | Newhause Bros., Bird-in-Hand, | 5.86 |
| 1180 | Victor Crop Grower, | J. H. Patterson, Columbia Cross Roads, | 8.18 |
| | UNION CHEMICAL WORKS, INC., NORTH WALES, PA. | | |
| 40 | Ideal Potato Manure (Planting Brand), | S. E. Schrack, Honey Brook, | 10.87 |
| 1585 | Ideal Potato Manure (Top Dressing Brand) | Newhauser Bros., Bird-in-Hand, | 6.83 |
| 613 | Potato and Celery Special, | Jonathon Swope, Myerstown, | 7.30 |
| 1549 | Super Phosphate and Potash No. 2, | Harry K. Mohr, Quakertown, | 9.80 |
| | UNITED FERTILIZER CO., CHICAGO, ILL. | | |
| 24 | Evergreen Brand Flower Lawn Fertilizer, | McClelland Co., Inc., Pittsburgh, | 4.74 |
| | UNITED STATES FERTILIZER CO., BALTIMORE MD. | | |
| 1125 | †Farm Bell Animal Ammoniated, | Wm. Eves, Jerseytown, | 7.53 |
| 73 | | L. A. Geiger, Joanna, | |
| 1434 | | I. G. Ernest, Somerset, | |
| 512 | †Farm Bell Fruit and Potato Guano, | A. J. Tidler, Sec. Grange 1246, Rock, | 7.85 |
| 171 | | Leslie Hunt, Meadville, | |
| 1432 | | I. G. Emert, Somerset, | |
| 272 | †Farm Bell Pennant Winner, | Biglerville Warehouse Co., Biglerville. | 8.68 |
| 63 | | L. A. Geiger, Joanna, | |
| 1127 | | Wm. Eves, Jerseytown, | |
| 964 | Farm Bell Potato and Tobacco Guano, | Joshua Shoemaker, Walnutport, | 6.08 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.97 | 9.00 | .45 | *9.42 | 10.00 | 3.22 | ...... | 3.22 | 3.00 | 1.00 | .82 | 21.57 | 24.00<br>22.00 | 1410<br>1479 |
| 8.46 | 8.00 | .48 | 8.94 | 9.00 | 5.78 | ...... | 5.78 | 5.00 | 1.29 | 1.65 | 25.14 | 28.00<br>33.00 | 188<br>1411 |
| *7.73 | 8.00 | .44 | *8.17 | 9.00 | 1.36 | ...... | 1.36 | 1.00 | .87 | .82 | 17.76 | 19.00 | 1480 |
| 7.21 | 7.00 | 2.2. | 9.45 | ...... | 3.22 | ...... | 3.22 | 3.00 | 1.63 | 1.65 | 23.61 | 28.00 | 429 |
| *5.29 | 6.00 | 1.85 | 7.24 | ...... | 11.14 | ...... | 11.14 | 10.00 | 3.21 | 3.30 | 37.22 | 37.00 | 427 |
| 6.23 | 6.00 | 1.27 | 7.50 | ...... | 10.31 | ...... | 10.31 | 10.00 | *2.85 | 3.30 | 34.88 | 35.00 | 426 |
| 8.57 | 8.00 | 1.19 | 9.76 | ...... | 10.13 | .18 | 10.31 | 10.00 | 1.69 | 1.65 | 32.01 | 31.00 | 428 |
| 8.68 | 8.00 | 1.24 | 9.92 | ...... | 5.47 | ...... | 5.47 | 5.00 | 1.58 | 1.65 | 26.73 | 28.00 | 1019 |
| 9.32 | 8.00 | .51 | 9.83 | ...... | 7.12 | ...... | 7.12 | 7.00 | 1.64 | 1.65 | 28.95 | 29.00 | 430 |
| 8.91 | 9.00 | 1.91 | 10.82 | 10.00 | 3.55 | ...... | 3.55 | 3.00 | 1.24 | 1.23 | 23.72 | 22.00 | 1935 |
| 7.64 | 7.00 | 1 21 | 8.85 | 8.00 | 2.13 | ...... | 2.13 | 2.00 | .80 | .21 | 18.62 | .....<br>19.00 | 1006<br>2001 |
| 5.98 | 6.00 | .89 | 6.87 | 7.00 | 10.26 | 2.27 | 12.53 | 10.00 | *2.80 | 3.30 | 37.03 | 32.00 | 1547 |
| *7.62 | 8.00 | .49 | *8.11 | 9.00 | 6.13 | 4.53 | 10.66 | 10.00 | 2.76 | 2.46 | 36.88 | 32.00<br>31.50 | 434<br>516 |
| 6.99 | 7.00 | 1.62 | 8.61 | 8.00 | 4.79 | ...... | 4.79 | 3.00 | 1.82 | 2.00 | 25.42 | 27.00 | 1925 |
| 6.07 | 6.00 | 1.02 | 7.09 | 7.00 | 8.97 | ...... | 8.97 | 7.00 | *4.90 | 5.77 | 42.58 | 42.00 | 1524 |
| 6.54 | 6.00 | 1.43 | 7.97 | 7.00 | 9.57 | ...... | *9.57 | 10.00 | 2.41 | 2.46 | 31.93 | 32.00 | 1523 |
| 7.26 | 7.00 | 1.78 | 9.04 | 8.00 | 9.47 | ...... | 9.47 | 8.00 | 1.55 | 1.64 | 29.42 | ..... | 1005 |
| 5.81 | 5.00 | 1.75 | 7.56 | 6.00 | 2.33 | ...... | 2.33 | 1.75 | 4.06 | 4.12 | 32.02 | 32.00 | 1008 |
| *7.74 | 8.00 | .88 | 8.62 | 8.50 | 10.08 | ...... | 10.08 | 10.00 | 1.60 | 1.65 | 30.32 | 25.00<br>32.00 | 253<br>314 |
| 7.82 | 8.00 | 1.41 | 9.23 | 8.50 | 4.64 | ...... | 4.64 | 4.00 | *.71 | .82 | 21.01 | 16.50 | 252 |
| 8.15 | 8.00 | 1.59 | 9.74 | 9.00 | 2.35 | ...... | 2.35 | 1.50 | 1.17 | 1.23 | 21.13 | 24.00 | 1954 |
| 6.55 | 6.00 | 1.28 | 7.83 | 7.00 | 3.25 | ...... | 3.25 | 2.00 | 3.80 | 3.29 | 30.07 | 28.00 | 1602 |
| *6.77 | 7.00 | 1.63 | 8.40 | 8.00 | 5.43 | ...... | 5.43 | 5.00 | *1.42 | 1.65 | 24.02 | 28.00 | 1953 |
| 8.81 | 8.00 | 1.24 | 10.05 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | .58 | .41 | 16.35 | 18.50 | 1794 |
| 6.58 | 6.00 | .89 | 7.47 | 7.00 | 5.49 | ...... | 5.49 | 5.00 | 1.01 | .82 | 21.69 | 24.00 | 1795 |
| 7.15 | 7.00 | 1.47 | 8.62 | 8.00 | 10.00 | ...... | 10.00 | 10.00 | 2.41 | 2.47 | 33.54 | 34.00 | 1955 |
| 7.94 | 7.00 | .77 | 8.71 | 8.00 | 9.96 | ...... | 9.96 | 10.00 | 1.64 | 1.23 | 30.19 | 29.00 | 1584 |
| 8.15 | 8.00 | 2.19 | 10.34 | 9.00 | 4.60 | ...... | 4.60 | 4.00 | .84 | .82 | 22.34 | 22.00 | 1180 |
| 8.52 | 8.00 | .47 | 8.99 | ...... | 4.00 | 5.32 | *9.32 | 10.00 | 3.11 | 3.30 | 38.24 | ..... | 46 |
| 8.44 | 8.00 | .55 | 8.99 | ...... | 6.93 | 3.91 | 10.84 | 10.00 | 3.41 | 3.30 | 40.80 | 38.00 | 1585 |
| 7.77 | 7.00 | .64 | 8.41 | ...... | 7.20 | 3.44 | 10.64 | 10.00 | 1.58 | 1.65 | 31.60 | 28.00 | 613 |
| *8.67 | 10.00 | 1.56 | 10.23 | ...... | 4.43 | ...... | *4.43 | 5.00 | .38 | ...... | 17.59 | 20.00 | 1540 |
| 17.92 | 14.50 | .46 | 18.38 | ...... | .80 | 16.93 | 17.73 | 15.00 | 8.74 | 8.00 | 84.96 | ..... | 24 |
| 8.77 | 8.00 | 1.11 | 9.88 | 9.00 | 4.80 | .62 | 5.42 | 5.00 | *1.26 | 1.65 | 25.26 | 21.50<br>22.00<br>22.50 | 1125<br>73<br>1434 |
| 8.31 | 8.00 | 1.25 | 9.56 | 9.00 | 10.80 | .40 | 11.20 | 10.00 | 1.65 | 1.65 | 32.52 | .....<br>30.00<br>26.50<br>20.00 | 512<br>171<br>1482<br>271 |
| 8.85 | 8.00 | .85 | 9.70 | 9.00 | 4.72 | ...... | 4.72 | 4.00 | .85 | .82 | 22.51 | 20.00<br>18.00 | 69<br>1127 |
| 7.73 | 7.00 | 1.28 | 9.01 | 8.00 | 9.43 | 1.26 | 10.69 | 10.00 | 2.69 | 2.46 | 36.40 | 29.25 | 964 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 2019 | Farm Bell Standard Guano, | New Providence Coal Co., New Providence. | 6.43 |
| 963 | †Farm Bell Trucker's Favorite, | Joshua Shoemaker, Walnutport, | 5.68 |
| 1239 | | H. P. Brown, Laureys, | |
| 962 | †Farm Bell Wheat, Oat and Corn Special, | Joshua Shoemaker, Walnutport, | 12.13 |
| 172 | | Leslie Hunt, Meadville, | |
| 1023 | | C. B. Tyler, Meshoppen, | |
| | VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA. | | |
| 1196 | V. C. C. Co.'s Fish Bone and Potash, | Geo. Kunkle, Winfield, | 8.25 |
| 1891 | | McCalmont & Co., Bellefonte, | |
| 631 | V. C. C. Co.'s National Ammoniated Guano. | J. R. Weaver & Bro., New Oxford, | 12.25 |
| | J. C. WALKER & CO., Gap, PA. | | |
| 1572 | Pride of Pequea High Grade Phosphate, | E. E. & W. J. S. Walker, Kinzers, | 4.78 |
| | W. E. WHANN CO., FOR, PHILADELPHIA, PA., BY THE A. A. C. CO., N. Y. | | |
| 1534 | Whann's Chester Valley Economist, | Milton Johnson, Quakertown, | 7.33 |
| 547 | Whann's Chester Valley 15% Guano, | Clinton Strammers, Trexlertown, | 8.15 |
| 1535 | | Milton Johnson, Quakertown, | |
| | ROBT A. WOOLDRIDGE CO., TRADING AS THE WOOLDRIDGE FERTILIZER CO., BALTIMORE, MD. | | |
| 1099 | Omega, | E. O. Hacker, Lincoln, | 5.28 |
| 1100 | F. F. V. Flesh and Fish Vegetator, | E. O. Hacker, Lincoln, | 6.78 |
| 1275 | †Tiger Phosphate, | E. O. Hacker, Lincoln, | 6.75 |
| 1098 | | S. B. Jackson, Carlisle, | |
| | ROBERT A. WOOLDRIDGE CO., THE, BALTIMORE, MD. | | |
| 107 | †Wooldridge's Champion Giant Phosphate, | Albert L. Kramer, Mohnton, | 10.90 |
| 436 | | F. G. Evans, Kelton, | |
| 393 | Wooldridge's Farmer's Favorite Cereal Compound. | Adam Beach, New Enterprise, | 7.03 |
| 418 | †Wooldridge's Fernwood Grange Mixture, | F. G. Evans, Kelton, | 9.10 |
| 787 | | C. C. Catherman, Millmont, | |
| 1251 | Wooldridge's High Grade Ammoniated Potash Fertilizer. | Wm. A. Schaffer, Tamaqua, | 6.95 |
| 332 | †Wooldridge's Special Potato and Tobacco Fertilizer. | V. A. Stufft, Imler, | 9.65 |
| 1276 | | S. B. Jackson, Carlisle, | |
| 786 | †Wooldridge's Trumpet Brand Phosphate, | C. C. Catherman, Millmont, | 9.75 |
| 417 | | F. G. Evans, Kelton, | |
| 1110 | | Henry D. Bard, Reinholds, | |
| | YORK CHEMICAL WORKS, YORK, PA. | | |
| 696 | †Dempwolf's Crop Grower, | A. P. Lippy, Littlestown, | 5.10 |
| 1679 | | C. F. Fendrick, Mercersburg, | |
| 604 | †Dempwolf's Early Trucker, | Chas. Geiger, Scarlet Mills, | 7.60 |
| 1254 | | J. F. Kistler, Tamaqua, | |
| 2176 | Dempwolf's Special Tobacco, | Henry Deiter, Strasburg, | 4.13 |
| 842 | Dempwolf's Harvest King, | Hershey Store Co., Hershey, | 7.65 |
| 337 | †Dempwolf's Harvest Queen, | A. C. Rupper, Halifax, | 9.65 |
| 140 | | A. C. Hartman, Dillsburg, | |
| 391 | | J. B. Hershbergh, Everett, | |
| 539 | †Dempwolf's Standard Potash, | S. T. Lebo, Halifax, | 6.65 |
| 139 | | A. C. Hartman, Dillsburg, | |
| 360 | | Andrew Coughenour, Harnedsville, | |
| 359 | †Dempwolf's Potato Manure, | Andrew Coughenour, Harnedsville, | 6.23 |
| 196 | | Maurice Leonard, Oakland Mills, | |
| 1674 | | P. S. Lehman, Chambersburg, | |
| 605 | †Dempwolf's Potato and Truck Special, | Chas. A. Geiger, Scarlet Mills, | 7.13 |
| 845 | | Hershey Store Co., Hershey, | |
| 695 | †Golden Sheaf, | A. P. Lippy, Littlestown, | 5.68 |
| 1218 | | Steininger Bros., Middleburg, | |
| 634 | One-Eight-Four, | A. P. Lippy, Littlestown, | 6.30 |
| | HENRY S. ZOOK, ELVERSON, PA. | | |
| 109 | No. 7 Pride of Chester Wheat, Corn and Potato Phosphate. | Jacob Stoltzfus, Elverson, | 7.28 |

†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.68 | 8.00 | 1.02 | 9.70 | 9.00 | 2.76 | ...... | 2.76 | 2.00 | 1.65 | 1.65 | 24.34 | 19.00 | 2019 |
| 7.42 | 6.00 | .83 | 8.25 | 7.00 | 9.63 | ...... | 9.63 | 8.00 | 3.28 | 3.28 | 37.25 | 29.58<br>30.80 | 963<br>1239 |
| 8.48 | 8.00 | .87 | 8.85 | 9.00 | 6.70 | ...... | 6.70 | 6.00 | .91 | .82 | 24.19 | 20.00<br>26.00<br>21.50 | 962<br>172<br>1028 |
| 8.60 | 8.00 | 2.70 | 11.30 | 9.00 | 3.32 | ...... | 3.32 | 3.00 | 1,60 | 1.65 | 25.14 | 20.00<br>24.00 | 1196<br>1891 |
| 8.60 | 8.00 | 2.55 | 11.15 | 9.00 | 4.29 | ...... | 4.29 | 4.00 | .87 | .82 | 22.66 | 18.00 | 631 |
| 7.72 | 7.00 | 1.43 | 9.15 | ...... | 2.53 | 5.66 | 8.19 | 8.00 | 2.38 | 2.47 | 33.62 | 29.00 | 1572 |
| 7.92 | 8.00 | 1.77 | 9.69 | 9.00 | 2.66 | ...... | 2.66 | 2.00 | .76 | .41 | 19.47 | 18.50 | 1534 |
| 9.38 | 7.00 | .84 | 10.22 | 8.00 | 8.34 | ...... | *8.34 | 15.00 | .85 | .82 | 26.74 | 27.75<br>33.00 | 547<br>1535 |
| 8.06 | 8.00 | .93 | 8.99 | 8.50 | 10.61 | ...... | 10.61 | 10.00 | .87 | .82 | 27.75 | 25.00 | 1099 |
| 7.14 | 7.00 | 2.42 | 9.56 | 7.50 | 7.10 | ...... | 7.10 | 7.00 | 2.46 | 2.47 | 31.27 | 28.00 | 1100 |
| 8.03 | 8.00 | 1.28 | 9.31 | 8.50 | 4.63 | ...... | 4.63 | 4.50 | 1.06 | 1.03 | 22.71 | 22.00<br>22.50 | 1098<br>1275 |
| 9.32 | 9.00 | 1.38 | 10.70 | 10.00 | 2.21 | ...... | 2.21 | 2.00 | .99 | .82 | 21.37 | 20.00<br>21.00 | 107<br>416 |
| 7.19 | 7.00 | .98 | 8.17 | 8.00 | 2.50 | ...... | 2.50 | 2.00 | .58 | .41 | 17.51 | 16.00 | 393 |
| 8.58 | 8.00 | 1.24 | 9.82 | 9.00 | 7.77 | ...... | *7.77 | 8.00 | 1.61 | 1.65 | 28.95 | 26.00<br>26.00 | 418<br>787 |
| 8.05 | 8.00 | .95 | 9.00 | 9.00 | 8.93 | ...... | *8.93 | 10.00 | 1.75 | 1.65 | 30.18 | 27.00 | 1251 |
| 9.41 | 9.00 | 1.22 | 10.63 | 10.00 | 5.05 | ...... | 5.05 | 5.00 | *1.45 | 1.65 | 26.37 | 28.00<br>26.00 | 382<br>1276 |
| 8.58 | 8.00 | 1.54 | 10.12 | 9.00 | 4.70 | ...... | 4.70 | 4.00 | 1.25 | 1.23 | 24.37 | 21.90<br>24.00<br>18.75 | 786<br>417<br>1110 |
| 8.05 | 8.00 | .93 | 8.98 | 8.50 | 2.02 | ...... | 2.02 | 1.00 | 1.09 | .82 | 20.12 | 18.00<br>15.50 | 696<br>1679 |
| *5.79 | 6.00 | 2.84 | 8.63 | 6.50 | 8.00 | .28 | 8.28 | 7.00 | 3.94 | 4.11 | 38.24 | .....<br>34.00 | 604<br>1254 |
| *4.78 | 5.00 | .67 | 5.45 | 5.50 | 1.20 | 10.23 | 11.43 | 10.00 | 3.61 | 3.29 | 40.16 | 40.00 | 2176 |
| 8.85 | 8.00 | .58 | 9.43 | 9.00 | 5.73 | ...... | 5.73 | 5.00 | 1.61 | 1.65 | 26.88 | 22.00 | 842 |
| 8.31 | 8.00 | 1.02 | 9.33 | 8.50 | 2.62 | ...... | 2.62 | 2.00 | .85 | .82 | 19.90 | 17.50<br>19.00<br>22.00 | 337<br>140<br>391 |
| 8.35 | 8.00 | 1.34 | 9.69 | 8.50 | 4.62 | ...... | 4.62 | 4.00 | .93 | .82 | 22.59 | .....<br>20.00<br>22.00 | 339<br>139<br>360 |
| 6.21 | 6.00 | 1.25 | 7.46 | 6.50 | 7.90 | ...... | 7.90 | 7.00 | .82 | .82 | 23.04 | 26.00<br>21.00<br>22.00 | 359<br>196<br>1674 |
| 8.11 | 8.00 | 1.57 | 9.68 | 9.00 | 1.33 | 6.74 | 8.07 | 7.00 | 2.53 | 2.46 | 34.93 | .....<br>33.00 | 606<br>845 |
| 8.21 | 8.00 | 1.06 | 9.27 | 8.50 | 2.40 | ...... | 2.40 | 2.00 | .66 | .29 | 18.68 | 18.00<br>15.00 | 695<br>1218 |
| 8.52 | 8.00 | 1.25 | 9.87 | 8.50 | 4.80 | ...... | 4.80 | 4.00 | .77 | .82 | 22.09 | 22.00 | 694 |
| 9.14 | 8.00 | .51 | 9.65 | 9.00 | 7.03 | ...... | 7.03 | 6.00 | 1.86 | 1.65 | 29.60 | 26.00 | 109 |

*Constituent falls below guaranty.

## ROCK AND POTASH

### Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK. | | |
| 593 | †Gem Alkaline Phosphate, ................ | Morris Reese, West Leesport, ...... | 7.48 |
| 260 | | O. F. Arnold, Dillsburg, ........... | |
| 926 | | H. F. Gump & Son, Everett, ........ | |
| 945 | †High Grade Phosphate, and Potash, .. | Savlor & Way, Somerset, ........... | 8.23 |
| 1832 | | B. F. Horting, Newport, ............ | |
| 1215 | †High Grade Potash Mixture, ............ | W. B. Winey, Middleburg, .......... | 6.68 |
| 594 | | Morris Reeser, West Leesport, ...... | |
| 1830 | | B. F. Horting, Newport, ............ | |
| 1064 | Bradley's Alkaline Phosphate and Potash, | S. K. Smith & Son, New Bethlehem, | 9.96 |
| 1463 | †Bradley's Big Crop, ...................... | G. R. Andrews, Enon Valley, ....... | 8.45 |
| 455 | | A. W. Sandt, Martins Creek, ...... | |
| 1474 | | W. J. Moyer, Fredonia, ............ | |
| 665 | Bradley's Circle Phosphate, ................ | R. C. King, Ulster, ................. | 10.00 |
| 681 | †Bradley's Magic Phosphate, ............... | H. A. Kramer & Son, Monroeton, .. | 11.23 |
| 1473 | | W. J. Moyer, Fredonia, ............. | |
| 47 | Canton Chem. Soluble Alkaline Phosphate, | A. H. Keely & Son, Schwenksville, | 11.00 |
| 1466 | †Crocker's Dissolved Phosphate and Potash. | L. P. Arner, Orangeville, Ohio, ... | 8.70 |
| 1055 | | Bentleyville Hdw. Co., Bentleyville, | |
| 1746 | | W. R. Stoughton Son, Petrolia, .... | |
| 812 | Crocker's Globe Phosphate, .................. | W. H. Rouser & Son, North East, .. | 9.25 |
| 1726 | Crocker's Paragon Phosphate, ............. | J. L. Culp, Indiana, ................. | 6.96 |
| 951 | †Crocker's Perfect Crop, .................. | Peter Haughenbuch, Nazareth, .... | 7.80 |
| 808 | | L. F. Haag, Girard, ................. | |
| 1053 | | Bentleyville Hdw. Co., Bentleyville, | |
| 1030 | East India Ideal Mixture, .................. | B. J. Dougherty, Meshoppen, ...... | 11.23 |
| 2 | Maryland Alkaline Phosphate, .............. | Hedge Farm, Marion, ............... | 9.85 |
| 467 | †North Western Choice Crop, .............. | Jno. Kunkle, Bath, .................. | 6.90 |
| 1250 | | Amos B. Sax, Wyoming, ............. | |
| 995 | North Western Electric Phosphate, ....... | L. E. Wilcox, Danboro, ............. | 10.05 |
| 1123 | North Western High Grade Alkaline Phosphate. | A. M. Schultz, Eyers Grove, ....... | 7.63 |
| 722 | North Western Horse Shoe Brand, ......... | L. R. Over, Curryville, .............. | 9.68 |
| 826 | Michigan Carbon Works Wheat and Grass Fertilizer. | Davis & Hyde, Spartansburg, ...... | 7.38 |
| 2228 | Milsom's Eclipse Phosphate, ................ | L. M. Roberts, Roulette, ............ | 9.60 |
| 596 | †Milsom's Star Crop, ...................... | Morris Reeser, West Leesport, .... | 7.66 |
| 914 | | Sol. F. Diehl, Lutzville, ............ | |
| 1282 | Moro Phillips Alkaline Phosphate, ........ | Nickles & Stewart, Shippensburg, .. | 8.28 |
| 468 | Read's Boss Crop, .......................... | Irwin Fisher, Nazareth, ............ | 7.48 |
| 469 | Read's Farmer's Reliable, .................. | Irwin Fisher, Nazareth, ............ | 8.53 |
| 22 | Reese's High Grade Potash Mixture, ....... | A. H. Fullerton, Edinburg, .......... | 9.88 |
| 267 | †Susquehanna High Grade Phosphate and Potash. | Z. J. Peters, Gernsey, .............. | 8.08 |
| 240 | | J. M. Getz Co., Lock Haven, ....... | |
| 1841 | | G. E. Beaver, Millerstown, ......... | |
| 87 | Wheeler's All Crop Grower, ................ | Wm. J. Johnson, Sinking Spring, .. | 9.26 |
| 489 | †Williams & Clark Banner Crop, ......... | C. E. Drake, Athens, ............... | 6.58 |
| 643 | †Williams & Clark Triumph Phosphate, | J. K. Hetrick, Sunbury, ............ | 8.73 |
| 652 | | Jas. H. Smith, Fishers Ferry, ..... | |
| 1981 | | Stewart Weaver, Easton, .......... | |
| 1195 | †Zell's Electric Phosphate, ............... | B. F. Hummel, Shamokin, .......... | 9 06 |
| 202 | | W. V. Shirk, Oakland Mills, ........ | |
| 1829 | | B. F. Horting, Newport, ............ | |
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | | |
| 1691 | American Special Potash Mixture, ......... | J. W. Hartman, Kauffman, ......... | 7.38 |
| 687 | †American Special Super Phosphate, ..... | A. D. Brown, East Berlin, ........... | 4.48 |
| 1525 | | N. B. Keim Sons, Langhorne, ....... | |
| 1526 | †Dissolved Phosphate and Potash, ........ | N. B. Keim Sons, Langhorne, ....... | 9.30 |
| 183 | | J. H. Neidigh, State College, ....... | |
| 1560 | | Jones Eavenson, Christiana, ......... | |
| | ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD. | | |
| 585 | †Banner Brand, ............................ | Chas. Yaeckle, Patton, .............. | 5.85 |
| 481 | | Windham Grange, Nichols, N. Y.. | |
| 769 | | Henry S. Brown, Cocolamus, ..... | |

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†Composite sample.

# FERTILIZERS.

## Acid and Potash.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| 6.77 | 6.00 | .55 | 7.32 | 7.00 | 3.22 | ...... | 3.22 | 3.00 | 12.73 | 15.00<br>18.50<br>15.00 | 598<br>260<br>926 |
| 12.48 | 12.00 | .59 | 13.07 | 13.00 | 5.67 | ...... | 5.67 | 5.00 | 19.36 | 19.50<br>15.75 | 945<br>1832 |
| 10.56 | 10.00 | .51 | 11.07 | 11.00 | 10.02 | ...... | 10.02 | 10.00 | 22.38 | 21.00<br>23.00<br>18.50 | 1215<br>594<br>1830 |
| 9.98 | 10.00 | 2.07 | 12.05 | 11.00 | 1.88 | ...... | 1.88 | 2.00 | 14.29 | 18.00 | 1064 |
| 10.07 | 8.00 | .56 | 10.63 | 9.00 | 4.71 | ...... | *4.71 | 5.00 | 16.68 | 19.00<br>16.00<br>20.00 | 1468<br>455<br>1474 |
| 10.40 | 10.00 | 1.27 | 11.67 | 11.00 | 7.56 | ...... | *7.56 | 8.00 | 20.05 | 22.00 | 665 |
| 11.97 | 12.00 | .69 | *12.66 | 13.00 | 4.91 | ...... | 4.91 | 5.00 | 18.26 | 20.00<br>21.00 | 681<br>1473 |
| 12.18 | 12.00 | .79 | 12.97 | 13.00 | 3.86 | ...... | 3.86 | 3.00 | 17.38 | 18.00 | 47 |
| 10.40 | 10.00 | 1.30 | 11.70 | 11.00 | 2.64 | ...... | 2.64 | 2.00 | 15.01 | 18.00<br>18.00<br>20.00 | 1466<br>1055<br>1746 |
| *9.58 | 10.00 | .55 | *10.13 | 11.00 | 8.04 | ...... | 8.04 | 8.00 | 19.72 | 21.00 | 812 |
| 12.88 | 12.00 | .78 | 13.66 | 13.00 | 5.48 | ...... | 5.48 | 5.00 | 19.58 | 20.00 | 1726 |
| 8.26 | 8.00 | .83 | 9.09 | 9.00 | 4.61 | ...... | *4.61 | 5.00 | 15.34 | .....<br>20.00<br>22.00 | 951<br>808<br>1053 |
| 10.50 | 10.00 | 1.27 | 11.77 | 11.00 | 2.19 | ...... | 2.19 | 2.00 | 14.66 | 18.00 | 1030 |
| 12.76 | 12.00 | .64 | 13.40 | 13.00 | 2.99 | ...... | 2.99 | 3.00 | 16.88 | ..... | 2 |
| 8.42 | 8.00 | .79 | 9.21 | 9.00 | 5.50 | ...... | 5.50 | 5.00 | 16.35 | 15.00<br>16.00 | 467<br>1259 |
| 10.31 | 10.00 | .86 | 11.17 | 11.00 | 2.01 | ...... | 2.01 | 2.00 | 14.17 | 16.00 | 996 |
| 10.58 | 10.00 | .84 | 11.42 | 11.00 | 8.14 | ...... | 8.14 | 8.00 | 20.64 | ..... | 1123 |
| 12.31 | 12.00 | .67 | 12.98 | 13.00 | 5.06 | ...... | 5.06 | 5.00 | 18.68 | 16.50 | 722 |
| 8.42 | 8.00 | .57 | 8.99 | 9.00 | 5.21 | ...... | 5.21 | 5.00 | 15.99 | 18.00 | 826 |
| 10.25 | 10.00 | .26 | *10.51 | 11.00 | 8.03 | ...... | 3.03 | 8.00 | 20.08 | ..... | 2228 |
| 8.85 | 8.00 | .69 | 9.54 | 9.00 | 4.95 | ...... | 4.95 | 5.00 | 16.08 | 18.00<br>14.00 | 596<br>914 |
| 10.14 | 10.00 | .59 | *10.73 | 11.00 | 2.23 | ...... | 2.25 | 2.00 | 14.22 | 14.00 | 1282 |
| 9.56 | 8.00 | .76 | 10.32 | 9.00 | 4.81 | ...... | 4.81 | 5.00 | 16.45 | 14.00 | 468 |
| 12.39 | 12.00 | .82 | 13.21 | 13.00 | 4.69 | ..... | *4.69 | 5.00 | 18.42 | 16.00 | 469 |
| 12.20 | 12.00 | .70 | 12.90 | 13.00 | 5.22 | ...... | 5.22 | 5.00 | 18.74 | 19.00 | 22 |
| 11.92 | 12.00 | 1.12 | 13.04 | 13.00 | 5.26 | ...... | 5.26 | 5.00 | 18.75 | 19.00<br>20.00<br>17.00 | 267<br>240<br>1841 |
| 6.54 | 6.00 | 1.09 | 7.63 | 7.00 | 3.14 | ...... | 3.14 | 3.00 | 12.73 | 14.00 | 87 |
| 8.47 | 8.00 | .89 | 9.36 | 9.00 | 5.31 | ...... | 5.31 | 5.00 | 16.22 | 19.00<br>16.00 | 489<br>643 |
| 10.14 | 10.00 | 1.17 | 11.31 | 11.00 | 2.45 | ...... | 2.45 | 2.00 | 14.62 | 15.00<br>20.00 | 652<br>1981 |
| 10.58 | 10.00 | .56 | 11.14 | 11.00 | 2.52 | ...... | 2.52 | 2.00 | 14.79 | .....<br>.....<br>12.25 | 1195<br>202<br>1829 |
| 9.60 | 8.00 | 1.49 | 11.09 | 9.00 | 4.17 | ...... | 4.17 | 4.00 | 16.09 | 14.00 | 1691 |
| 5.94 | 6.00 | 1.56 | 7.50 | 7.00 | 3.32 | ...... | 3.32 | 3.00 | 12.62 | 12.00<br>14.00 | 687<br>1525 |
| 10.50 | 10.00 | 1.68 | 12.18 | 11.00 | 2.12 | ...... | 2.12 | 2.00 | 14.72 | 15.10<br>13.50<br>13.00 | 1526<br>188<br>1560 |
| 10.02 | 10.00 | .54 | 10.56 | 10.50 | 8.35 | ...... | 8.35 | 8.00 | 20.32 | 18.00<br>16.00<br>18.00 | 585<br>481<br>769 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| 445 | †Phosphate and Potash No. 1, | Reese H. White, Honeybrook, | 9.33 |
| 362 | | P. J. Cower & Son, Meyersdale, | |
| 564 | †Potash Mixture, | Seligman & Co., Tamaqua, | 5.75 |
| 771 | | Henry S. Brown, Cocolamus, | |
| 923 | | Jno. Hershberger, Everett, | |
| 397 | †Sure Crop, | A. L. Iches, Osterburg, | 8.95 |
| 356 | | Confluence Lumber Yard, Confluence, | |
| 734 | | E. H. Buhle, Williamsburg, | |
| | BALTIMORE FERTILIZER CO., BALTIMORE, MD. | | |
| 624 | Honest, 8 and 3, | I. N. Leightner, Gettysburg, | 7.33 |
| 230 | Honest, 10 and 5, | H. E. Van Orner, Thompsontown, | 11.33 |
| | BAUGH & SONS CO., PHILADELPHIA, PA. | | |
| 457 | †Baugh's Sol. Alkaline Super Phosphate, | John F. Stier, Johnsonville, | 10.55 |
| 234 | | E. H. Hays, Clintondale, | |
| 582 | | H. L. Stultz & Bro., Altoona, | |
| 265 | †Baugh's 10 and 4 Phosphate and Potash Mixture. | Grover C. Myers, Idaville, | 9.85 |
| 233 | | E. H. Hays, Clintondale, | |
| 340 | | Peter E. Enders, Halifax, | |
| | BERGER BROTHERS, EASTON, PA. | | |
| 1625 | Peerless Phosphate, | John Osterstock, Easton, | 6.63 |
| | BOWKER'S FERTILIZER CO., NEW YORK CITY. | | |
| 1457 | †Bowker's Empire State Phosphate and Potash. | Kernochen & Co., Titusville, | 7.48 |
| 1404 | | B. F. Fink, Huntingdon, | |
| 1939 | | Harry L. Moses, Chester Springs, | |
| 1078 | †Bowker's Golden Harvest Fertilizer, | A. N. Levan & Son, Kutztown, | 9.48 |
| 1766 | †Bowker's S. & P. Fertilizer, | H. B. Harned, Wyoming, | 9.78 |
| 848 | | Jno. H. Hibshman, Myerstown, | |
| 1940 | | Harry L. Moses, Chester Springs, | |
| 1972 | †Bowker's Super Phosphate with Potash, | Murry & Co., Honesdale, | 4.05 |
| 729 | | H. L. Stultz, Hollidaysburg, | |
| 1802 | | Geo. Manners, Pitman, | |
| | CENTRAL CHEMICAL CO., HAGERSTOWN, MD. | | |
| 1871 | Big Crop Compound, | L. H. Leitre & Bro., Greencastle, | 6.35 |
| 1283 | C. C. C. Commonwealth Phosphate and Potash. | Nickles & Stewart, Shippensburg, | 9.98 |
| 3 | C. C. C. Eastern Star, | Michael Ickes, Scotland, | 6.45 |
| 1683 | C. C. C. Great Southern, | J. A. Witherspoon, Mercersburg, | 7.65 |
| 775 | †C. C. C. Pioneer Majestic, | J. Laudonslager, Thompsontown, | 8.85 |
| 334 | | J. H. Weiter, Halifax, | |
| 1138 | | W. F. Slagle, Bloomsburg, | |
| 776 | †C. C. C. Potash Special, | J. Laudonslager, Thompsontown, | 7.58 |
| 1855 | | A. H. Ulsh, Millerstown, | |
| 881 | C. C. C. Potato Grower, | M. G. Adams, Paxinos, | 8.00 |
| | CHESAPEAKE CHEMICAL CO., THE, BALTIMORE, MD. | | |
| 720 | C. C. Co's Celebrated Mixture, | Wm. Biller, Patton, | 10.15 |
| 719 | C. C. Co's Reliable Phosphate, | Wm. Biller, Patton, | 11.98 |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 1501 | †Columbia Double Ten Potash Mixture, | Jno. Kelsa, Mansfield, | 9.30 |
| 487 | | Henry Bressler, Athens, | |
| 1655 | | Wm. H. Briton, Falls Creek, | |
| 2072 | Columbia Premium Phosphate and Potash, | A. C. Dougherty, Grove City, | 7.55 |
| | JOSIAH COPE & CO., BALTIMORE, MD. | | |
| 1554 | †Jos. Cope & Co. High Grade Phosphate and Potash. | Jones Eavenson, Christiana, | 8.70 |
| 1934 | | Geo K. Watson, Embreeville, | |
| 1556 | †Jos. Cope & Co., Soluble Phosphate and Potash. | Jones Eavenson, Christiana, | 8.80 |
| 909 | | H. W. Beaver, Schellsburg, | |
| 1928 | | F. E. Bailey, Northbrook, | |
| 919 | †Jos. Cope & Co. Universal Mixture for All Crops. | Frances Baker, Everett, | 8.38 |
| 1555 | | Jones Eavenson, Christiana, | |

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†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | | | |
| 10.15 | 10.00 | .77 | 10.92 | 10.50 | 2.21 | ...... | 2.21 | 2.00 | 14.23 | 14.00<br>17.00<br>18.00 | 445<br>362<br>564 |
| 6.05 | 6.00 | .56 | 6.61 | 6.50 | 3.18 | ...... | 3.18 | 3.00 | 12.22 | 13.00<br>15.00 | 771<br>923 |
| 8.21 | 8.00 | .32 | 8.53 | 8.50 | 5.47 | ...... | 5.47 | 5.00 | 15.99 | .....<br>17.00<br>15.00 | 397<br>356<br>734 |
| 8.38 | 8.00 | .33 | *8.71 | 9.00 | 3.77 | ...... | 3.77 | 3.00 | 14.37 | 15.00 | 624 |
| 11.20 | 10.00 | 1.47 | 12.67 | 11.00 | 5.32 | ...... | 5.32 | 5.00 | 18.40 | 15.75 | 230 |
| 10.67 | 10.00 | .55 | 11.22 | ........ | 2.46 | ...... | 2.46 | 2.00 | 14.77 | .....<br>15.50<br>17.00 | 457<br>234<br>582 |
| 10.65 | 10.00 | 1.08 | 11.73 | ........ | 4.72 | ...... | 4.72 | 4.00 | 17.26 | 14.50<br>17.50<br>16.00 | 265<br>233<br>340 |
| 8.39 | 8.00 | 1.15 | 9.54 | 9.00 | 5.12 | ...... | 5.12 | 5.00 | 16.08 | 16.00 | 1625 |
| 7.99 | 8.00 | .66 | *8.65 | 9.00 | 3.41 | ...... | 3.41 | 3.00 | 13.84 | 20.00<br>18.00<br>20.00 | 1457<br>1404<br>1939 |
| 12.36 | 12.00 | .91 | 13.27 | 13.00 | 4.87 | ...... | 4.87 | 5.00 | 18.56 | 20.00<br>..... | 1078<br>1766 |
| 11.30 | 10.00 | .79 | 12.09 | 11.00 | 1.39 | ...... | 1.39 | 1.00 | 14.25 | 17.00<br>18.00 | 848<br>1940 |
| 11.25 | 10.00 | 77 | 12 02 | 11.00 | 2.35 | ...... | 2.35 | 2.00 | 15.18 | 20.00<br>16.00<br>15.20 | 1972<br>729<br>1802 |
| 8.45 | 8.00 | .28 | 8.73 | ........ | 4.87 | ...... | 4.87 | 5.00 | 15.56 | 14.00 | 1871 |
| *9.70 | 10.00 | .39 | 10.09 | ........ | 2.42 | ...... | 2.42 | 2.00 | 13.98 | 14.00 | 1283 |
| 11.43 | 10.00 | .52 | 11.95 | 11.00 | 5.09 | ...... | 5.09 | 4 00 | 18.08 | 14.00 | 3 |
| 9.87 | 10.00 | .21 | 10.08 | ........ | 5.53 | ...... | 5.53 | 5.00 | 17.18 | 15.50 | 1683 |
| 8.46 | 8.00 | .12 | 8.58 | ........ | 5.38 | ...... | 5.38 | 5.00 | 16.08 | 15.50<br>14.00<br>18.00 | 775<br>334<br>1138 |
| 12.79 | 12.00 | .28 | 13.07 | ........ | 5.64 | ...... | 5.64 | 5.00 | 19.47 | 19.00<br>18.00 | 776<br>1855 |
| 10.51 | 10.00 | .13 | 10.64 | ........ | 10.70 | ...... | 10.70 | 10.00 | 22.94 | 22.00 | 881 |
| 11.05 | 10.00 | 1.10 | 12.15 | 11.00 | 2.96 | ...... | 2.96 | 2.00 | 15.76 | 14.00 | 720 |
| 10.57 | 10.00 | 2.33 | 12.90 | 11.00 | 4.35 | ...... | 4.35 | 4.00 | 17.29 | 15.00 | 719 |
| 10.38 | 10.00 | 1 17 | 11.55 | 10.50 | 9.60 | ...... | *9.60 | 10.00 | 22.10 | 20.00<br>22.50<br>21.70 | 1501<br>487<br>1655 |
| 10.28 | 10.00 | 1.08 | 11.35 | 10.50 | 8.31 | ...... | 8.31 | 8.00 | 20.65 | 20.00 | 2072 |
| *9.54 | 10.00 | .84 | *10.38 | 11.00 | 5.12 | ...... | 5.12 | 5.00 | 16.80 | 16.00<br>17.00 | 1554<br>1934 |
| 10.37 | 10.00 | .62 | 10.99 | 11.00 | 2.31 | ...... | 2.31 | 2.00 | 14.46 | 14.00<br>14.10<br>14.00 | 1556<br>909<br>1928 |
| 9.05 | 8.00 | .54 | 9.59 | 9.00 | 7.77 | ...... | *7.77 | 10.00 | 19.08 | 20.00<br>19.00 | 919<br>1555 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **JAS. G. DOWNWARD CO., THE, COATESVILLE, PA.** | | |
| 2074 | Soluble Phosphate and Potash, | Abraham Reese, New Providence, | 6.15 |
| | **EUREKA CHEMICAL CO., BALTIMORE, MD.** | | |
| 1842 | †Eureka Alkaline No. 2, | E. G. Sheaffer, Oriental, | 8.95 |
| 865 | | Geo. Stober, Kleinfelterville, | |
| 2016 | | New Prov. Coal Co., New Providence | |
| | **FARMER'S FERTILIZER WORKS, THE, ELIZABETHTOWN, PA.** | | |
| 332 | Sure Crop, | Chas. G. Shetron, Millersburg, | 7.58 |
| | **W. S. FARMER & CO., BALTIMORE, MD.** | | |
| 1368 | W. S. Farmer & Co's Corn, Oats and Buckwheat. | D. J. Trout, Stewartstown, | 6.60 |
| | **GRIFFITH & BOYD CO., BALTIMORE, MD.** | | |
| 764 | Monarch Brand, | B. F. Gayman, Thompsontown, | 7.08 |
| 1373 | †Special Grain Grower, | H. W. Rehmeyer, Turnpike, | 9.23 |
| 615 | | H. J. Van Dyke, Gettysburg, | |
| 1838 | | Kipp & Moore, Millerstown, | |
| 887 | †X. X. Potash Manure, | E. D. Tewksbury, Catawissa, | 10.48 |
| 404 | | Passmore & Co., Nottingham, | |
| 763 | | B. F. Gayman, Thompsontown, | |
| | **W. S. HASTINGS & SON, ATGLEN, PA.** | | |
| 1512 | Star Brand, | W. S. Hastings & Son, Atglen, | 8.30 |
| | **S. M. HESS & BRO., INC., PHILADLPHIA, PA.** | | |
| 1070 | †S. M. Hess & Bro's Emperor Phosphate, | Sam D. Snyder, Myerstown, | 9.30 |
| 1639 | | Milton A. Buck, Kunkletown, | |
| 717 | †S. M. Hess & Bro's Farmer's Grain and Clover Grower. | J. H. and H. J. Hoover, Patton, | 7.53 |
| 792 | | J. R. Iddenings, Mifflinburg, | |
| 653 | | Jacob Driebellis, Trevorton, | |
| 378 | †S. M. Hess & Bro's Soluble Phosphate and Potash. | A. F. Hengst, Osterburg, | 9.03 |
| 718 | | J. H. and H. J. Hoover, Patton, | |
| 377 | †Standard Alkaline, | A. F. Hengst, Osterburg, | 8.33 |
| 645 | | Reuben Herman, Sunbury, | |
| | **HUBBARD FERTILIZER CO., THE, BALTIMORE, MD.** | | |
| 712 | Hubbard's Alkaline 10 and 8, | Wm. Biller, Patton, | 11.35 |
| 1428 | Hubbard's Corn and Buckwheat 6—3, | Peffer & Son, Punxsutawney, | 5.63 |
| 1607 | †Hubbard's Special Mixture 10—4, | D. C. Shuman, Bloomsburg, | 10.60 |
| 278 | | Biglerville Warehouse Co., Biglerville. | |
| 2029 | | H. G. Niggins, New Providence, | |
| | **INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTZ. WORKS, BUFFALO, N. Y.** | | |
| 1755 | Extra Phosphate and Potash, | Harmony Cereal Mills, Harmony, | 6.00 |
| 1754 | †General Crop, | Harmony Cereal Mills, Harmony, | 7.40 |
| 1781 | | C. D. Bower & Bro., Berwick, | |
| 1415 | Phosphate and Potash, | Reynoldsville Hdw. Co., Reynoldsville. | 7.80 |
| | **INTERNATIONAL AGRICULTURAL CORPORATION, PENNA. FERTZ. CO., BUFFALO, N. Y.** | | |
| 1416 | Grass and Grain, | Reynoldsville Hdw. Co., Reynoldsville. | 10.45 |
| | **JARECKI CHEMICAL CO., THE, SANDUSKY, OHIO.** | | |
| 13 | Square Brand Phosphate and Potash, | Eugene Burnette, Utica, | 8.77 |

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†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | | | |
| *7.71 | 9.00 | .63 | *8.34 | 10.00 | 4.02 | ...... | 4.02 | 4.00 | 14.26 | ..... | 2024 |
| 11.02 | 10.00 | .59 | 11.61 | 10.50 | 2.17 | ...... | 2.17 | 2.00 | 14.73 | 14.50<br>17.50<br>13.00 | 1842<br>865<br>2016 |
| 10.89 | 10.00 | .37 | 11.26 | ........ | 7.80 | ...... | *7.80 | 8.00 | 20.34 | 19.75 | 332 |
| 6.16 | 6.00 | .27 | *6.43 | 7.00 | 3.67 | ...... | 3.67 | 3.00 | 12.68 | 14.00 | 1368 |
| 8.54 | 8.00 | 3.06 | 11.60 | 9.00 | 5.65 | ...... | 5.65 | 5.00 | 17.42 | 16.00 | 764 |
| 10.14 | 10.00 | 2.65 | 13.79 | 11.00 | 3.04 | ...... | 3.04 | 2.00 | 15.78 | 12.50<br>14.50<br>13.50 | 1373<br>615<br>1838 |
| 10.79 | 10.00 | 2.19 | 12.98 | 11.00 | 5.12 | ...... | 5.12 | 5.00 | 18.17 | 17.00<br>17.00<br>17.00 | 887<br>404<br>763 |
| 10.72 | 10.00 | .51 | 11.23 | ........ | 5.22 | ...... | 5.22 | 5.00 | 17.62 | 16.00 | 1512 |
| 9.94 | 10.00 | 1.50 | 11.44 | 11.00 | 1.46 | ...... | 1.46 | 1.00 | 13.58 | 15.00<br>16.00 | 1070<br>1639 |
| 10.63 | 10.00 | .92 | 11.60 | 11.00 | 7.57 | ..... | *7 57 | 8.00 | 20.13 | 17.00<br>19.50 | 717<br>792 |
| 11.03 | 10.00 | .51 | 11.54 | 11.00 | 2.25 | ...... | 2.25 | 2.00 | 14 83 | 21.00<br>25.00<br>12.25 | 653<br>378<br>718 |
| 8.27 | 8.00 | .63 | 8.90 | 9.00 | 5.09 | ...... | 5.09 | 5.00 | 15.79 | 16.50<br>17.00 | 377<br>645 |
| 10.11 | 10.00 | 1.91 | 12.02 | 11.00 | 7.76 | ..... | *7.76 | 8.00 | 20.26 | 18.00 | 712 |
| 7.66 | 6.00 | 1.96 | 9.62 | 7.00 | 3.34 | ...... | 3.34 | 3.00 | 14.04 | 17.00 | 1428 |
| 10.77 | 10.00 | 1.52 | 12.29 | 11.00 | 4.52 | ...... | 4.52 | 4.00 | 17.31 | 16.00<br>17.00<br>15.00 | 1607<br>278<br>2029 |
| 10.08 | 10.00 | 1.13 | 11.21 | 11.00 | 7.38 | ..... | *7.38 | 8.00 | 19.62 | 20.00 | 1755 |
| 9.52 | 9.00 | .93 | 10.45 | 10.00 | 3.16 | ...... | 3.16 | 3.00 | 14.82 | 16.00<br>15.00 | 1754<br>1781 |
| 12.48 | 12.00 | .75 | 13.23 | 13.00 | 5.02 | ...... | 5.02 | 5.00 | 18.78 | 21.00 | 1415 |
| 10.60 | 10.00 | .62 | 11.22 | 11.00 | 1.92 | ...... | 1.92 | 2.00 | 14.19 | 16.50 | 1416 |
| *9.40 | 10.00 | 1 28 | *10.68 | 11.00 | 1.85 | ...... | 1.85 | 2.00 | 13.52 | 18.00 | 13 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **LANCASTER CHEMICAL CO., LANCASTER, PA.** | | |
| 774 | No. 16, Phosphoric Acid and Potash Special. | Emil Ward, Thompsontown, | 8.20 |
| 204 | No. 13, Special Potash Manure, | C. S. Winey, McAllisterville, | 8.70 |
| | **LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.** | | |
| 1181 | †Lister's Superior Dissolved Phosphate and Potash. | D. T. Gates, Columbia Cross Roads, | 8.25 |
| 1701 | | John Thomas, Wellsboro, | |
| 388 | †Lister's Potash Mixture, | J. N. Wertz, Bedford, | 6.88 |
| 231 | | Knecht Milling Co., Parvin, | |
| 855 | | Isaac Plasterer, Lebanon, | |
| | **FREDERICK LUDHAM CO., THE, BALTIMORE, MD.** | | |
| 2201 | Ludham's "Cecrops Fertilizers," Economy, | Wm. Hess, Quarryville, | 5.98 |
| 2202 | Ludham's "Cecrops Fertilizers," I. X. L. Brand. | Wm. Hess, Quarryville, | 6.48 |
| | **D. B. MARTIN & CO., PHILADELPHIA, PA.** | | |
| 194 | Martin's No. 4 Potash and Soluble Phosphate. | T. J. Novinger, Lewistown, | 11.33 |
| | **MILLER FERTILIZER CO., THE, BALTIMORE, MD.** | | |
| 238 | Miller's Potash Mixture, | W. L. Wolfe, Booneville, | 9.95 |
| 641 | Special Alkaline, | J. H. Gass, Sunbury, | 8.25 |
| | **NASSAU FERTILIZER CO., NEW YORK CITY.** | | |
| 383 | †Grass and Grain Fertilizer, | F. B. Corle, Piara, | 9.98 |
| 257 | | Harry Baker, Clear Spring, | |
| 671 | | Chas. Usher, E. Smithfield, | |
| 1210 | †Royal Mixture, | S. J. Stewart, Selinsgrove, | 7.40 |
| 155 | | S. B. King, York Springs, | |
| 905 | | C. Mechle, Osterburg, | |
| | **G. OBER & SONS CO., BALTIMORE, MD.** | | |
| 623 | †Ober's Big 4 Special Fertilizer, | D. Blocher & Co., Gettysburg, | 8.03 |
| 367 | | Shipley Hdw. Co., Meyersdale, | |
| 649 | | John Phillips, Sunbury, | |
| | **PATAPSCO GUANO CO., BALTIMORE, MD.** | | |
| 1170 | Patapsco Superior Alkaline Manure, | Jas. McNamara, Cadis, | 8.05 |
| 767 | †Patapsco Alkaline Plant Food, | Jno. Harley, Thompsontown, | 7.80 |
| 619 | | E. C. Thomas, Gettysburg, | |
| 1713 | | James Seagers, Westfield, | |
| 306 | †Patapsco Phospho Potash, | Geo. W. Robinson, Allenwood, | 6.58 |
| 633 | | J. N. Hersh, New Oxford, | |
| 925 | | P. J. Blough's Sons, Hooversville, | |
| 634 | †Patapsco Soluble Phosphate and Potash, | Granville Merc. Co., Granville Summit. | 8.45 |
| 1187 | | J. N. Hersh, New Oxford, | |
| | **PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.** | | |
| 1851 | Piedmont Farmer's Potash Mixture, | A. H. Ulsh, Millerstown, | 9.63 |
| 617 | Piedmont Soluble Phosphate and Potash Mixture. | H. D. and J. F. Bream, Gettysburg, | 4.70 |
| 256 | Piedmont Special Potash Mixture, | D. F. Stitzel, York Springs, | 8.10 |
| | **PIONEER FERTILIZER CO., CLEVELAND, OHIO.** | | |
| 20 | Pioneer 10-8 Fertilizer, | Wm. H. Roadhouse, Greenville, | 6.08 |
| | **RASIN MONUMENTAL CO., BALTIMORE, MD.** | | |
| 185 | †Rasin's Phosphate and Potash Fertilizer, | O. B. McCormick, State College, | 10.00 |
| 153 | | J. M. Ferrance, Dillsburg, | |
| 1422 | | Peffer & Son, Punxsutawney, | |
| 152 | †Rasin's Wheat and Truck Mixture, | J. M. Ferrence, Dillsburg, | 10.20 |
| 116 | | Chas. Yaeckle, Patton, | |
| 302 | | N. W. Troup, Elizabethville, | |

†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. Available. Found. | Phosphoric Acid in 100 Pounds. Available. Guaranteed. | Phosphoric Acid in 100 Pounds. Insoluble. | Phosphoric Acid in 100 Pounds. Total. Found. | Phosphoric Acid in 100 Pounds. Total. Guaranteed. | Potash in 100 Pounds. Present as muriate. | Potash in 100 Pounds. Present as sulphate. | Potash in 100 Pounds. Total. Found. | Potash in 100 Pounds. Total. Guaranteed. | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *8.30 | 10.00 | 2.64 | 10.94 | 11.00 | 8.60 | ...... | 8.60 | 8.00 | 20.01 | 19.60 | 774 |
| *8.40 | 10.00 | 2.08 | *10.48 | 11.00 | 5.52 | ...... | 5.52 | 5.00 | 16.82 | ..... | 204 |
| 10.37 | 10.00 | .48 | 10.85 | 11.00 | 7.82 | ...... | 7.82 | 8.00 | 20.12 | 22.00<br>20.00 | 1181<br>1701 |
| 8.54 | 8.00 | .48 | 9.02 | 9.00 | 5.24 | ...... | 5.24 | 5.00 | 16.08 | 16.00<br>17.00<br>17.00 | 388<br>231<br>856 |
| 6.58 | 6.00 | .27 | 6.85 | 7.00 | 3.55 | ...... | 3.55 | 3.00 | 12.87 | ..... | 2201 |
| 8.32 | 8.00 | .36 | *8.68 | 9.00 | 5.41 | ...... | 5.41 | 5.00 | 16.05 | ..... | 2202 |
| 12.28 | 8.00 | .27 | 12.55 | ........ | 5.67 | ...... | 5.67 | 5.00 | 19.11 | 17.00 | 194 |
| 10.92 | 10.00 | .87 | 11.79 | 10.50 | 5.51 | ...... | 5.51 | 5.00 | 18.19 | 18.00 | 238 |
| 11.10 | 8.00 | .46 | 11.56 | 8.50 | 2.61 | ...... | *2.61 | 5 00 | 15.21 | 18.00 | 641 |
| 10.68 | 10.00 | .60 | 11.28 | 11.00 | 2.43 | ...... | 2.43 | 2.00 | 14.82 | 16.00<br>13.50<br>16.00 | 383<br>257<br>671 |
| 8.33 | 8.00 | .66 | 8.99 | 9.00 | 5.38 | ...... | 5.38 | 5.00 | 16.16 | 14.15<br>14.90<br>16.00 | 1210<br>155<br>905 |
| 9.33 | 8.00 | .42 | 9.75 | 9.00 | 4.27 | ...... | 4.27 | 4.00 | 15.61 | 16.00<br>16.00<br>16.00 | 623<br>367<br>649 |
| 10.50 | 10.00 | .81 | 11.31 | 11.00 | 8.48 | ...... | 8.48 | 8.00 | 20.86 | 19.60 | 1170 |
| 8.76 | 8.00 | .60 | 9.36 | 9.00 | 5.18 | ...... | 5.18 | 5.00 | 16.22 | 15.50<br>16.00<br>15.00 | 767<br>619<br>1713 |
| 6.57 | 6.00 | .48 | 7.05 | 7.00 | 2.97 | ...... | 2.97 | 3.00 | 12.31 | 18.00<br>15.00<br>15.00 | 806<br>633<br>935 |
| 10.53 | 10.00 | .62 | 11.15 | 11.00 | 2.39 | ...... | 2.39 | 2.00 | 14.66 | 16.50<br>13.50 | 634<br>1187 |
| 10.21 | 10.00 | .47 | 10.68 | ........ | 1.98 | ...... | 1.98 | 2.00 | 13 99 | 14.50 | 1851 |
| *7.78 | 8.00 | .66 | 8.44 | ........ | 2.41 | ...... | 2.41 | 2.00 | 12.70 | 14.50 | 617 |
| 10.29 | 10.00 | .50 | 10.79 | ........ | 4.77 | ...... | *4.77 | 5.00 | 16.84 | 15.50 | 256 |
| 9.82 | 10.00 | .63 | *10.45 | 11.00 | 6.61 | ...... | *6.61 | 8.00 | 18.43 | 22.00 | 20 |
| 10.90 | 10.00 | 1.72 | 12.62 | 11.00 | 2.39 | ...... | 2.39 | 2.00 | 15.31 | 13.75<br>12.50<br>17.00 | 185<br>158<br>1422 |
| 9.81 | 10.00 | 2.08 | 11.89 | 11.00 | 8.04 | ...... | 8.04 | 8.00 | 20.42 | 17.00<br>18.00<br>17.00 | 152<br>116<br>302 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 1226 | †Economy Brand, | Benj. Hoffman, McClure, | 6.88 |
| 986 | | B. F. Shearer, Dublin, | |
| 1482 | | G. J. Smith, Gleason, | |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 1222 | †Royster's Alkaline Phosphate, | T. C. Walter, Winfield, | 3.63 |
| 761 | | B. F. Gayman, Thompsontown, | |
| 1721 | | I. W. Gibson, Indiana, | |
| 684 | †Royster's Bumper Crop Phosphate, | L. C. Blair, Rummerfield, | 6.90 |
| 249 | | J. L. Ditzler, Milton, | |
| 709 | | Humbert & King, Littlestown, | |
| 685 | †Royster's Peerless Grain and Grass Grower. | L. C. Blair, Rummerfield, | 7.45 |
| 156 | | Wm. Howe, York Springs, | |
| 765 | | B. F. Gayman, Thompsontown, | |
| 1904 | Royster's Superior Potash Mixture, | R. D. Formon, Center Hall, | 4.03 |
| | SCOTT FERTILIZER CO., THE, ELKTON, MD. | | |
| 2186 | Scott's Tip Top and Potash, | S. Book & Bro., Quarryville, | 10.53 |
| | S. M. SHULER & SON, LIVERPOOL, PA., BY THE A. A. C. CO., N. Y. | | |
| 7 | Shuler's Phosphate and Potash, | S. M. Shuler & Son, Liverpool, | 8.70 |
| | SMITH AGRICULTURAL CHEMICAL CO., COLUMBUS, OHIO. | | |
| 180 | Ohio Farmer's Climax Phosphate, | Kirkland & Co., Girard, | 10.13 |
| 16 | Ohio Farmer's Soluble Phosphate and Potash. | Geo. J. Abbey, West Springfield, | 8.99 |
| | SWIFT & CO., CHICAGO, ILL. | | |
| 1472 | †Swift's Pure Diamond G. Fertilizer, | G. D. McCutcheon, Fredonia, | 8.25 |
| 735 | | P. J. Osterling & Son, Butler, | |
| 1730 | | Jas. McCullough, Kittanning, | |
| 1566 | †Swift's Pure Plantation Phosphate and Potash. | H. W. Sweigart, Gap, | 6.43 |
| 1718 | | G. R. Stewart, Indiana, | |
| 1165 | †Swift's Pure Special Phosphate and Potash. | G. R. Stewart, Indiana, | 7.23 |
| 821 | | B. S. Tallmadge, McKean, | |
| 1231 | | S. A. Hostetler, Bellevue, | |
| | I. P. THOMAS & SONS CO., PHILADELPHIA, PA. | | |
| 289 | †Bulls Eye Fertilizer, | Ed. Shuey, Lickdale, | 9.85 |
| 105 | | B. M. Stoltzfus, Elverson, | |
| 331 | | Phil. Noll, Millersburg, | |
| 834 | †Pilot Potash Manure, | John S. Engle, Hummelstown, | 8.38 |
| 646 | | Frances Kerstetter, Sunbury, | |
| 973 | | Geo. Hayden, Kesslerville, | |
| 486 | †Special Corn and Grain Fertilizer, | Henry & Bressler, Athens, | 9.23 |
| 280 | | Ed. Shuey, Lickdale, | |
| 972 | | Geo. Hayden, Kesslerville, | |
| 648 | Thomas' Square Deal Fertilizer, | Francis Kerstetter, Sunbury, | 2.95 |
| | JAMES THOMAS, WILLIAMSPORT, PA. | | |
| 1066 | †Thomas' Dissolved Alkaline Phosphate, | McEwen Hdw. Co., New Bethlehem, | 9.75 |
| 1189 | | T. E. Shoemaker, Granville Summit, | |
| | TUSCARORA FERTILIZER CO., BALTIMORE, MD. | | |
| 315 | †Alkaline, | R. C. Garber, Washington, | 11.33 |
| 1451 | | Frederick & Inks, Fairchance, | |
| 1450 | Tuscarora Potash Mixture, | Frederick & Inks, Fairchance, | 5.06 |
| | J. E. TYGERT & CO., PHILA., PA., BY A. A. C. CO., NEW YORK. | | |
| 1601 | Soluble Phosphate and Potash, | Geo. S. Miller, Mifflinville, | 9.20 |
| | UNION CHEMICAL WORKS, INC., NORTH WALES, PA. | | |
| 1539 | Super Phosphate and Potash No. 1, | Harry K. Mohr, Quakertown, | 4.03 |
| 875 | Super Phosphate and Potash for Potatoes, | Christian Kreider, Lebanon, | 7.43 |

†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| 7.80 | 6.00 | .83 | 8.13 | 7.00 | 3.65 | ...... | 3.65 | 3.00 | 13.69 | 15.50<br>17.00<br>15.00 | 1226<br>986<br>1482 |
| 5.93 | 6.00 | .47 | 6.40 | 6.50 | 2.97 | ...... | 2.97 | 3.00 | 11.86 | 13.00<br>14.00<br>15.00 | 1222<br>761<br>1721 |
| 8.90 | 8.00 | .28 | 9.18 | 8.50 | 4.86 | ...... | 4.86 | 5.00 | 15.86 | 15.00<br>.....<br>15.00 | 684<br>249<br>709 |
| 10.29 | 10.00 | .70 | 10.99 | 10.50 | 2.17 | ...... | 2.17 | 2.00 | 14.26 | 15.00<br>14.00<br>15.00 | 685<br>156<br>765 |
| 13.46 | 12.00 | 1.10 | 14.56 | 12.50 | 6.06 | ...... | 6.06 | 5.00 | 20.65 | 18.65 | 1904 |
| 11.18 | 10.00 | .99 | 12.15 | ........ | 2.17 | ...... | 2.17 | 2.00 | 14.98 | 14.00 | 2186 |
| 8.55 | 8.00 | .78 | 9.33 | 9.00 | 2.66 | ...... | 2.66 | 2.00 | 13.54 | 13.50 | 7 |
| 10.80 | 10.00 | 1.03 | 11.83 | ........ | 5.75 | ...... | 5.75 | 5.00 | 18.43 | 19.75 | 180 |
| 11.18 | 10.00 | .97 | 12.15 | ........ | 2.43 | ...... | 2.43 | 2.00 | 15.31 | 20.00 | 16 |
| 9.90 | 10.00 | 1.22 | 11.12 | ........ | 7.88 | ...... | 7.88 | 8.00 | 20.02 | 24.00<br>21.00<br>21.00 | 1472<br>735<br>1730 |
| *7.71 | 8.00 | .86 | *8.57 | 9.00 | 5.32 | ...... | 5.82 | 5.00 | 15.67 | 15.00<br>16.50 | 1566<br>1718 |
| 10.19 | 10.00 | 1.49 | 11.68 | ........ | 1.92 | ...... | 1.92 | 2.00 | 14.23 | 15.50<br>16.00<br>15.50 | 1165<br>821<br>1231 |
| 10.08 | 10.00 | .73 | *10.76 | 11.00 | 7.82 | ...... | 7.82 | 8.00 | 19.84 | 19.50<br>20.00<br>18.00 | 289<br>105<br>331 |
| 8.41 | 8.00 | .56 | 8.97 | 9.00 | 5.51 | ...... | 5.51 | 5.00 | 16.27 | 15.50<br>.....<br>..... | 834<br>646<br>973 |
| 10.75 | 10.00 | .23 | 10.98 | 11.00 | 6.36 | ...... | 6.36 | 6.50 | 18.72 | 20.00<br>20.50<br>..... | 486<br>280<br>972 |
| 9.05 | 9.00 | .64 | *9.69 | 10.00 | 3.71 | ...... | 3.71 | 3.00 | 14.94 | 16.00 | 648 |
| *9.48 | 10.00 | .25 | *9.73 | 11.00 | 2.17 | ...... | 2.17 | 2.00 | 13.53 | 18.00<br>17.00 | 1066<br>1189 |
| 10.10 | 10.00 | .80 | 10.90 | 10.50 | 5.10 | ...... | 5.10 | 5.00 | 17.17 | 20.00<br>20.00 | 315<br>1451 |
| 6.06 | 6.00 | .61 | 6.67 | 6.50 | 2.49 | ...... | *2.49 | 3.00 | 12.53 | 16.00 | 1450 |
| 10.37 | 10.00 | 1.44 | 11.81 | 11.00 | 2.15 | ...... | 2.15 | 2.00 | 15.48 | 15.50 | 1601 |
| *8.16 | 10.00 | 1.26 | 9.42 | ........ | 2.99 | ...... | 2.99 | 2.00 | 18.78 | 18.00 | 1539 |
| 8.14 | 8.00 | .81 | 8.45 | ........ | 10.31 | ...... | 10.31 | 10.00 | 20.89 | 20.00 | 875 |

*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | UNITED STATES FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 72 | †Farm Bell Alkaline Mixture, | L. A. Geiger, Joanna, | 8.73 |
| 1431 | | J. G. Everett, Somerset, | |
| 269 | †Farm Bell Fruit and Grain Grower, | Biglerville Whse. Co., Biglerville, | 9.28 |
| 165 | | J. Wilson Hamilton, Meadville, | |
| 609 | | E. M. Weller & Co., Landis Store, | |
| 166 | †Farm Bell Phosphate and Potash, | J. Wilson Hamilton, Meadville, | 9.23 |
| 71 | | L. A. Geiger, Joanna, | |
| 629 | | L. H. Miller, New Oxford, | |
| 247 | Farm Bell Phospho Potassa, | Jno. H. Weaver, East Earl, | 10.73 |
| 1435 | Farm Bell Ten Five Mixture, | J. G. Everet, Somerset, | 7.43 |
| | VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA. | | |
| 1198 | †V. C. C. Co's Peerless Phosphate and Potash. | Geo. Kunkle, Winfield, | 7.93 |
| 1310 | | J. D. Markle, Hanover, | |
| 630 | †V. C. C. Co's Union Super Phosphate, | J. Weaver & Bro., New Oxford, | 5.68 |
| 1321 | | Frank Hope, Spring Grove, | |
| | W. E. WHANN & CO., PHILADELPHIA. | | |
| 1516 | Whann's Alkaline Phosphate, | E. H. Keen & Co., Parkesburg, | 9.58 |
| 1517 | Whann's Chester Valley Favorite Fertilizer. | E. H. Keen & Co., Parkesburg, | 6.35 |
| | ROBERT A. WOOLDRIDGE CO., THE, BALTIMORE, MD. | | |
| 881 | Wooldridge's Ideal Grain and Grass Producer. | V. A. Stufft, Imler, | 8.56 |
| 2164 | Wooldridge's German Potash Mixture, | H. G. Niggins, New Providence, | 7.73 |
| 562 | †Wooldridge's No. 2 Phosphate and Potash. | Rufus Bohr, Snedburg, | 8.83 |
| 1111 | | Henry D. Bard, Reinhold, | |
| 788 | †Wooldridge's Old Sledge Phosphate, | C. C. Catherman, Milmont, | 8.23 |
| 1401 | | F. A. Hurst, Huntingdon, | |
| | YORK CHEMICAL WORKS, YORK, PA. | | |
| 1317 | Dempwolf's Black Cross, | M. J. Sheffer, Hanover, | 5.85 |
| 693 | †Dempwolf's Phosphate and Potash, | H. M. Berkheimer, Abbottstown, | 6.90 |
| 598 | | C. B. Reppert, Shoemakersville, | |
| 910 | | Norman G. Miller, Cessna, | |
| 338 | †Dempwolf's York Special, | L. T. Lebo, Halifax, | 7.25 |
| 235 | | Sugar Valley Grange No. 1470, Loganton. | |
| 858 | | Andrew Coughenour, Harnesville, | |

†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | | | |
| 10.26 | 10.00 | .54 | *10.80 | 11.00 | 2.85 | ...... | 2.85 | 2.00 | 14.89 | 14.00<br>13.25 | 72<br>1431 |
| 10.51 | 10.00 | .36 | 10.87 | 11.00 | 8.68 | ..... | 8.68 | 8.00 | 20.97 | 20.00<br>21.00<br>22.00 | 269<br>165<br>609 |
| 8.91 | 8.00 | .13 | 9.04 | 9.00 | 4.99 | ...... | 4.99 | 5.00 | 15.97 | 16.00<br>15.00<br>13.50 | 166<br>71<br>629 |
| 12.79 | 12.00 | .17 | 12.96 | 13.00 | 5.47 | ...... | 5.47 | 5.00 | 19.23 | 15.00 | 2217 |
| 10.48 | 10.00 | .29 | *10.77 | 11.00 | 5.96 | ...... | 5.96 | 5.00 | 18.13 | 15.75 | 1435 |
| 8.68 | 8.00 | 1.61 | 10.29 | 9.00 | 2.15 | ...... | 2.15 | 2.00 | 13.44 | 12.00<br>13.50 | 1198<br>1310 |
| 6.36 | 6.00 | 1.71 | 8.07 | 7.00 | 3.22 | ...... | 3.22 | 3.00 | 12.85 | 12.00<br>14.00 | 630<br>1321 |
| 10.10 | 8.00 | 1.50 | 11.60 | 9.00 | 2.17 | ...... | 2.17 | 2.00 | 14.41 | 15.00 | 1516 |
| 10.42 | 10.00 | .76 | 11.18 | 11.00 | 10.81 | ...... | 10.81 | 10.00 | 23.22 | 21.00 | 1517 |
| 10.70 | 10.00 | .57 | 11.27 | 11.00 | 4.29 | ...... | 4.29 | 4.00 | 16.82 | 18.00 | 381 |
| 10.06 | 10.00 | .45 | *10.51 | 11.00 | 2.44 | ...... | 2.44 | 2.00 | 14.30 | 14.00 | 2164 |
| 8.49 | 8.00 | .69 | 9.18 | 9.00 | 4.83 | ...... | 4.83 | 5.00 | 15.72 | 16.00<br>13.25 | 562<br>1111 |
| 12.72 | 12.00 | .64 | 13.36 | 13.00 | 5.55 | ...... | 5.55 | 5.00 | 19.45 | 18.00<br>..... | 788<br>1401 |
| 10.52 | 10.00 | .47 | 10.99 | 10.50 | 2.50 | ...... | 2.50 | 2.00 | 14.72 | 16.00 | 1817 |
| 10.74 | 10.00 | .54 | 11.28 | 10.50 | 2.44 | ...... | 2.44 | 2.00 | 14.84 | 14.00<br>13.00<br>15.00 | 693<br>598<br>910 |
| 8.50 | 8.00 | .36 | 8.86 | 8.50 | 4.04 | ...... | 4.04 | 4.00 | 14.78 | .....<br>14.50<br>17.50 | 338<br>235<br>358 |

*Constituent falls below guaranty.

# DISSOLVED BONE

## Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | BOWKER FERTILIZER CO., NEW YORK. | |
| 591 | †Bowker's Ammoniated O. I. O. Phosphate. | Hamburg Supply House, Hamburg, |
| 1612 | | Mrs. J. H. Rose, Riverside, |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | |
| 33 | Pure Dissolved Animal Matter, | N. M. Dodd, Tippecanoe, |
| 150 | †Martin's Crop Producer, | Cook & Co., Dillsburg, |
| 1244 | | A. F. Kimmel, Orwigsburg, |
| | F. W. TUNNELL & CO., PHILADELPHIA, PA. | |
| 1956 | Raw Acidulated Animal Compound, | M. C. Michener, Media, |

†Composite sample.

# FERTILIZERS.

## Acid and Nitrogen.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. | | | | | Nitrogen in 100 Pounds. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Available. | | Insoluble. | Total. | | | | | | |
| | Found. | Guaranteed. | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.13 | 10.42 | 10.00 | 1.91 | 12.33 | 11.00 | .95 | .62 | 19.10 | 16.00<br>16.10 | 591<br>1612 |
| 6.00 | *10.31 | 12.00 | 3.65 | 13.96 | ........ | 1.69 | 1.65 | 23.24 | ..... | 83 |
| 10.45 | 11.09 | 10.00 | 1.75 | 12 84 | ........ | 1.23 | 1.03 | 21.07 | 15.25<br>17.00 | 150<br>1244 |
| 5.00 | 10.26 | 10.00 | 9.12 | *19.38 | 20.00 | *1.16 | 1.64 | 23.10 | 28.00 | 1956 |

*Constituent falls below guaranty.

# ACIDULATED

## Furnishing

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | **AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK.** | |
| 1063 | †14% Acid Phosphate, | S. K. Smith & Son, New Bethlehem, |
| 682 | | H. A. Cramer & Son, Monroeton, |
| 1183 | | Lamont Berry, Troy, |
| 700 | 16% Acid Phosphate, | J. H. Kelly, Littlestown, |
| 1647 | †12% Acid Phosphate, | Punxsutawney Milling Co., Punxsutawney, |
| 1747 | | W. R. Stoughton & Son, Petrolia, |
| 35 | Detrick's Dissolved S. C. Phosphate, | The Atlantic Crushed Coke Co., Greensburg, |
| 1356 | Lazaretto Dissolved Phosphate, | Grove & Uffelman, Park, |
| 721 | Maryland Dissolved S. C. Phosphate, | L. R. Over, Curryville, |
| 1957 | Reese's Dissolved Phosphate of Lime, | Wm. C. Ball, Media, |
| | **ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD.** | |
| 479 | Star Phosphate, | Windham Grange, Nichols, N. Y., |
| 361 | | P. J. Cover & Son, Meyersdale, |
| 901 | | Grant Beaver, Catawissa, |
| | **ATLANTIC FERTILIZER CO., BALTIMORE, MD.** | |
| 949 | Atlantic Dissolved Phosphate, | Robt. Speicher, Rockwood, |
| | **BAUGH & SONS CO., PHILADELPHIA, PA.** | |
| 436 | †Baugh's High Grade Acid Phosphate, | Ed. Brinton & Sons, West Chester, |
| 78 | | L. A. Geiger, Joanna, |
| 1136 | | A. W. Eves, Iola, |
| 472 | †Baugh's 16% Acid Phosphate, | Jas. E. Eastman, Rome, |
| 394 | | M. L. Logan, Woodbury, |
| 635 | | E. M. Neely, New Oxford, |
| | **BOWKER FERTILIZER CO., NEW YORK.** | |
| 1426 | †Bowker's Dissolved Phosphate, | Peffer & Son, Punxsutawney, |
| 1977 | | Murry & Co., Honesdale, |
| | **CENTRAL CHEMICAL CO., HAGERSTOWN, MD.** | |
| 45 | C. C. C. Acid Phosphate, | D. R. Bomberger, Manheim, |
| 1139 | †C. C. C. Dissolved Phosphate, | W. F. Slagle, Bloomsburg, |
| 1862 | | J. A. Witherspoon, Mercersburg, |
| | **CHESAPEAKE CHEMICAL CO., THE, BALTIMORE, MD.** | |
| 590 | C. C. Co.'s Dissolved Phosphate, | Wm. Biller, Patton, |
| | **COE MORTIMER CO., THE, NEW YORK.** | |
| 1772 | E. Frank Coe's High Grade Soluble Phosphate. | A. H. Cohleigh, Pikes Creek, |
| | **COLUMBIA GUANO CO., BALTIMORE, MD.** | |
| 11 | Columbia 14% Acid Phosphate, | P. E. Phillips, New Bethlehem, |
| | **W. S. FARMER & CO., BALTIMORE, MD.** | |
| 1870 | W. S. Farmer & Co.'s Dissolved S. C. Phosphate. | D. J. Trout, Stewartstown, |
| | **GRIFFITH & BOYD CO., BALTIMORE, MD.** | |
| 1864 | †Griffith & Boyd's High Grade Acid Phosphate. | C. Leib & Co., Stewartstown, |
| 1191 | | Adam Krug, Allenwood, |
| 1995 | | W. C. Herr, Strasburg, |
| | **W. S. HASTINGS & SON, ATGLEN, PA.** | |
| 1513 | Clear Acid Phosphate, | W. S. Hastings & Sons, Atglen, |
| | **S. M. HESS & BROS., INC., PHILADELPHIA, PA.** | |
| 716 | S. M. Hess & Bros.' High Grade Acid Phosphate. | J. H. & H. J. Hoover, Patton, |

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†Composite sample.

# ROCK PHOSPHATE.

## Phosphoric Acid.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. | | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|
| | Available. | | | Total. | | | | |
| | Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | | | |
| 9.45 | 14.61 | 14.00 | 1.29 | 15.90 | 15.00 | 14.18 | 14.00<br>15.00<br>15.00 | 1063<br>682<br>1188 |
| 7.78 | 17.03 | 16.00 | .57 | 17.60 | 17.00 | 15.62 | 14.00 | 700 |
| 6.55 | *11.13 | 12.00 | 2.39 | 13.52 | 13.00 | 12.06 | 20.00<br>26.00 | 1647<br>1747 |
| 8.74 | *13.52 | 14.00 | 1.13 | *14.65 | 15.00 | 13.35 | ..... | 35 |
| 8.33 | 15.15 | 14.00 | .67 | 15.82 | 15.00 | 14.35 | 12.00 | 1356 |
| 8.68 | 14.06 | 14.00 | .96 | 15.02 | 15.00 | 13.66 | 12.00 | 721 |
| 6.30 | 14.25 | 14.00 | .85 | 15.10 | 15.00 | 13.78 | 14.00 | 1957 |
| 9.65 | 14.65 | 14.00 | .47 | 15.12 | 14.50 | 13.92 | 12.00<br>16.00<br>12.00 | 479<br>861<br>901 |
| 8.50 | 14.23 | 14.00 | .89 | 15.12 | 15.00 | 13.75 | 13.00 | 949 |
| 5.63 | 16.59 | 14.00 | 1.31 | 17.90 | ..... | 15.62 | 13.00<br>12.00<br>12.00 | 436<br>78<br>1136 |
| 12.33 | 17.31 | 16.00 | 1.24 | 18.55 | ..... | 16.11 | 12.36<br>12.30<br>12.00 | 472<br>394<br>635 |
| 6.50 | *10.41 | 11.00 | 2.08 | 12.49 | 12.00 | 11.48 | 15.00<br>15.00 | 1426<br>1977 |
| 9.62 | 15.53 | 14.00 | .46 | 15.99 | 15.00 | 14.56 | ..... | 45 |
| 6.85 | 14 17 | 14.00 | .35 | 14.52 | ..... | 13.50 | 14.00<br>13.00 | 1139<br>1682 |
| 8.78 | 15.38 | 14.00 | 3.53 | 18.91 | 15.00 | 15.55 | 13.00 | 590 |
| 8.29 | 14.92 | 14.00 | 1.44 | 16.36 | 15.00 | 14.46 | ..... | 1772 |
| 3.35 | 15.13 | 14.00 | .57 | 15.70 | 14.50 | 14.31 | ..... | 11 |
| 10.55 | 15.19 | 14.00 | .57 | 15.76 | 15.00 | 14.35 | 12.50 | 1370 |
| 9.68 | 14.78 | 14.00 | 2.01 | 16.79 | 15.00 | 14.58 | 13.00<br>13.00<br>14.00 | 1864<br>1191<br>1995 |
| 1.95 | 16.08 | 14.00 | .65 | 16.73 | ..... | 15.03 | 12.00 | 1513 |
| 9.58 | 14.78 | 14.00 | .64 | 15.42 | 15.00 | 14.06 | 12.50 | 716 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | |
| 1738 | Hubbard's 16% Phosphate, | Alex Strittmatter, Ebensburg, |
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO, N. Y. | |
| 2064 | Dissolved Phosphate, | H. B. Harn, Mercer, |
| | LANCASTER CHEMICAL CO., THE, LANCASTER, PA. | |
| 2002 | Acid Phosphate, | J. B. Bucher, Lititz, |
| | F. MEHRING, KEYMAR, MD. | |
| 703 | Acid Phosphate, | J. N. Slifer, Littlestown, |
| | NITRATE AGENCIES CO., NEW YORK. | |
| 410 | †High Grade Acid Phosphate, | B. R. Watson, Oxford, |
| 86 | | Wernersville Asylum Farm, |
| 1257 | | Wm. K. Goss, Dallas, |
| | G. OBER & SONS CO., BALTIMORE, MD. | |
| 642 | †Ober's Dissolved Phosphate, | John Phillips, Sunbury, |
| 690 | | Denton Myers, East Berlin, |
| | PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. | |
| 1399 | Piedmont 14% Acid Phosphate, | J. G. Simpson, Huntingdon. |
| | PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA. | |
| 28 | Acid Phosphate, | B. Way Co., Freeport, |
| | RAMSBURG FERTILIZER CO., THE, FREDERICK, MD. | |
| 706 | Super Phosphate, | Humbert & Krug, Littlestown, |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | |
| 859 | Sea Wall Special, | Elias S. Brubacher, Richland, |
| | READING BONE FERTILIZER CO., READING, PA. | |
| 421 | †Soluble Dissolved Phosphate, | M. B. Hickman, West Chester, |
| 1225 | | Benj. Hoffman, McClure, |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | |
| 1446 | †Royster's 14% Acid Phosphate, | H. A. Grimm, Fairchance, |
| 132 | | Abraham Hostetter, Johnstown, |
| 1724 | | I. W. Gibson, Indiana, |
| 710 | Royster's High Grade 16% Acid Phosprate, | Humbert & King, Littlestown, |
| | SCHAAL SHELDON FERTILIZER CO., BUFFALO, N. Y. | |
| 829 | Dissolved Phosphate, | Brooklyn Milling Co., Spartansburg, |
| | SCOTT FERTILIZER CO., THE, ELKTON, MD. | |
| 857 | †Scott's Tip Top Soluble Phosphate, | Elias S. Brubacher, Richland, |
| 1943 | | Wm. C. Hallbrook, Ercildown, |
| | SMITH AGRICULTURAL CHEMICAL CO., THE, COLUMBUS, OHIO. | |
| 176 | Ohio Farmer Alkaline Phosphate, | C. R. Forbes, Albion, |
| | SWACK'S FERTILIZER WORKS, DUBOIS, PA. | |
| 2234 | Swack's Acid Phosphate, | Wm. C. Moore's Farm, Corsica, |
| | SWIFT & CO., BALTIMORE, MD. | |
| 42 | Swift's Pure High Grade Acid Phosphate, | R. Smith Guthrie, Parkesburg, |
| | JAMES THOMAS, WILLIAMSPORT, PA. | |
| 1067 | †Thomas' Dissolved Florida Phosphate, | McEwer Hdw. Co., New Bethlehem, |
| 1412 | | Keystone Hdw. Co., Reynoldsville, |

†Composite sample.

PHOSPHATE—Continued.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. Available. Found. | Phosphoric Acid in 100 Pounds. Available. Guaranteed. | Phosphoric Acid in 100 Pounds. Insoluble. | Phosphoric Acid in 100 Pounds. Total. Found. | Phosphoric Acid in 100 Pounds. Total. Guaranteed. | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|
| 9.60 | 17.29 | 16.00 | .28 | 17.57 | 17.00 | 15.75 | 14.00 | 1738 |
| 5.00 | 15.22 | 14.00 | .43 | 15.65 | 15.00 | 14.31 | 15.50 | 2064 |
| 9.28 | *13.34 | 14.00 | 1.48 | 14.82 | 15.00 | 13.84 | 12.00 | 2002 |
| 7.40 | 18.06 | 16.00 | .28 | 18.34 | 17.00 | 16.30 | 14.00 | 708 |
| 10.65 | 16.20 | 14.00 | 1.31 | 17.51 | 15.00 | 15.33 | 18.00<br>.....<br>13.50 | 410<br>86<br>1257 |
| 7.68 | 16.79 | 14.00 | .16 | 16.95 | 15.00 | 15.36 | 14.00<br>13.00 | 642<br>690 |
| 6.60 | 15.24 | 14.00 | 1.06 | 16.30 | ..... | 14.56 | 13.50 | 1399 |
| 10.34 | 12.33 | 11.00 | .96 | 13.29 | 12.00 | 12.46 | 16.00 | 23 |
| 11.98 | 17.25 | 14.00 | .77 | 18.02 | ..... | 15.90 | 12.00 | 706 |
| 3.83 | 11.94 | 10.00 | .98 | 12.92 | 11.00 | 12.15 | 12.00 | 859 |
| 9.55 | 13.74 | 12.00 | 1.20 | 14.94 | 13.00 | 13.53 | 13.00<br>15.60 | 431<br>1225 |
| 8.05 | 14.47 | 14.00 | 1.33 | 15.80 | 14.50 | 14.10 | 15.00<br>14.00<br>15.00 | 1446<br>132<br>1724 |
| 5.60 | *15.26 | 16.00 | .70 | *15.96 | 16.50 | 14.53 | 14.00 | 710 |
| 8.30 | 13.99 | 14.00 | .57 | *14.56 | 15.00 | 13.48 | 15.00 | 829 |
| 9.30 | 17.46 | 14.00 | .33 | 17.79 | ..... | 15.90 | 14.50<br>13.00 | 857<br>1943 |
| 6.20 | 14.86 | 14.00 | 2.13 | 16.99 | ..... | 14.67 | 18.00 | 176 |
| 13.15 | 15.57 | 14.00 | .07 | 15.64 | ..... | 14.46 | 11.00 | 2234 |
| 5.60 | 16.43 | 16.00 | 1.21 | 17.64 | ..... | 15.48 | 14.00 | 42 |
| 8.38 | 12.28 | 12.00 | .16 | *13.44 | 14.00 | 12.12 | 15.00<br>.... | 1067<br>1412 |

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*Constituent falls below guaranty

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | F. W. TUNNELL & CO., PHILADELPHIA, PA. | |
| 517 | Dissolved Rock, | W. M. Gehman, Macungie, |
| | J. E. TYGERT CO., THE, PHILADELPHIA, PA., BY THE A. A. C. CO. | |
| 2233 | Tygert's Acid Phosphate, | Wm. J. Groover & Son, Newfield, |
| | UNITED STATES FERTILIZER CO., THE, BALTIMORE, MD. | |
| 1132<br>268<br>1124 | †Farm Bell Acid Phosphate, | John Sones, Opp,<br>Biglerville Warehouse Co., Biglerville,<br>Wm. Ewes, Jerseytown, |
| | ROBT. A. WOOLDRIDGE CO., THE, BALTIMORE, MD. | |
| 561<br>785 | †Wooldridges Florida Acid Phosphate, | Rufus Bohr, Snedburg,<br>C. C. Catherman, Millmont, |

†Composite sample.

PHOSPHATE—Continued.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. | | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|
| | Available. | | | Total. | | | | |
| | Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | | | |
| 3.85 | *12.04 | 14.00 | 2.93 | 14.97 | 15.00 | 12.92 | 15.00 | 517 |
| 8.50 | 14.33 | 14.00 | 1.21 | 15.54 | 15.00 | 13.96 | 16.00 | 2233 |
| 10.30 | 16.60 | 14.00 | .23 | 16.83 | 15.00 | 15.25 | 13.00<br>14.00<br>13.50 | 1182<br>268<br>1124 |
| 10.08 | *13.02 | 14.00 | .53 | *13.55 | 15.00 | 12.76 | 14.00<br>13.85 | 561<br>785 |

*Constituent falls below guaranty.

# GROUND BONE
## Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK. | |
| 419 | | F. G. Evans, Kelton, |
| 117 | †Fine Ground Bone, | Wm. Biller, Patton, |
| 939 | | A. A. Miller, Somerset, |
| 570 | †High Grade Ground Bone, | H. L. Orr, Tyrone, |
| 1085 | | J. G. Leighton, Tunkhannock, |
| 726 | | H. L. Shultz, Hollidaysburg, |
| 247 | †Pure Raw Bone, | H. L. Lindner, Milton, |
| 1367 | | D. J. Trout, Stewartstown, |
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | |
| 1559 | Pure Raw Bone, | Jones Eavenson, Christiana, |
| | ARMOUR FERTILIZER WORKS, BALTIMORE, MD. | |
| 584 | †Bone Meal, | Chas. Yaeckle, Patton, |
| 1571 | | J. C. Walker & Sons Co., Gap, |
| | ASSOCIATED CHEMICAL CO., HAGERSTOWN, MD. | |
| 2131 | Fine Raw Bone, | Smith Bros. Co., Ridgway, |
| | BAUGH & SONS CO., PHILADELPHIA, PA. | |
| 1158 | | A. George & Son, Homer City, |
| 1135 | †Baugh's Raw Bone Meal, Warranted | A. W. Eves, Iola, |
| 1515 | Pure. | E. H. Keen & Co., Parkesburg, |
| | BERG CO., THE, PHILADELPHIA, PA. | |
| 408 | Berg's Raw Bone, Fine, | B. R. Watson, Oxford, |
| 1998 | | W. C. Herr, Strass, |
| | BOWKER FERTILIZER CO., NEW YORK. | |
| 12 | †Bowker's Bone Flour for Florists' Use, | W. M. Deyoe & Co., South Oil City, |
| 26 | | W. C. Beckert, Pittsburgh, |
| | CAMBRIA FERTILIZER CO., JOHNSTOWN, PA. | |
| 37 | Pure Fine Ground Bone Dust, | Claude Davis, Windber, |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | |
| 60 | Columbia Fine Ground Bone Meal, | Scranton Florist Supply Co., Scranton, |
| | JOSIAH COPE & CO., BALTIMORE, MD. | |
| 1930 | Joseph Cope & Co.'s Pure Raw Bone, | F. E. Bailey, Northbrook, |
| | WALLACE DUNGAN, DOYLESTOWN, PA. | |
| 1916 | Bone Flour, | Wallace Dungan, Doylestown, |
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | |
| 1996 | Pure Fine Ground Bone Meal, | W. G Herr, Strasburg, |
| 1365 | Soft Ground Bone Meal, | J. C. Leib & Co., Stewartstown, |
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y. | |
| 1707 | Bone Meal, | A. S. Lent, Middleburg Center, |
| | JARECKI CHEMICAL CO., THE, SANDUSKY, OHIO. | |
| 1461 | Pure Ground Bone, | Clark Bros., Oil City, |
| | LANCASTER CHEMICAL CO., LANCASTER, PA. | |
| 2091 | No. 9 Bone Meal, | Nevin Miller, Cottage, |
| | HENRY F. MITCHELL CO., PHILADELPHIA, PA. | |
| 54 | Mitchell's Pure Bone Meal, | Henry F. Michell, Philadelphia, |

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†Composite sample.

# FERTILIZERS.

## Acid and Nitrogen.

| Moisture in 100 pounds. | Mechanical Analysis. | | Chemical Analysis. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Phosphoric Acid. | | Nitrogen. | | | | |
| | Diameter less than 1-50 inch "fine." | Diameter greater than 1-50 inch "coarse." | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 4.90 | 40 | 60 | 25.30 | 22.88 | 2.44 | 2.47 | 30.10 | 32.00<br>32.00<br>31.00 | 419<br>117<br>939 |
| 5.78 | 53 | 47 | 20.63 | 20.59 | 3.76 | 3.29 | 32.68 | 36.00<br>35.00 | 570<br>1035 |
| 6.53 | 54 | 46 | 21.41 | 21.51 | 3.75 | 3.70 | 33.31 | 34.00<br>34.00<br>32.00 | 726<br>247<br>1367 |
| 6.15 | 47 | 53 | *21.88 | 22.50 | 3.84 | 3.70 | 33.54 | 31.00 | 1559 |
| 3.15 | 58 | 42 | 23.03 | 22.50 | 2.67 | 2.47 | 30.52 | 29.00<br>30.00 | 584<br>1571 |
| 4.40 | 58 | 42 | 23.56 | 20.00 | *2.64 | 3.70 | 30.90 | 33.00 | 2131 |
| 6.75 | 64 | 36 | 21.62 | 21.50 | 3.69 | 3.70 | 33.92 | 33.00<br>33.00<br>32.00 | 1158<br>1135<br>1515 |
| 4.33 | 55 | 45 | 23.03 | 22.00 | 3.55 | 3.00 | 33.80 | 31.00<br>30.00 | 408<br>1998 |
| 3.40 | 98 | 2 | 22.00 | 19.3 | 3.11 | 2.06 | 34.38 | .......<br>††55.00 | 12<br>26 |
| 5.15 | 46 | 54 | 24.03 | 20.00 | 3.13 | 3.00 | 32.32 | 32.00 | 37 |
| 12.33 | 57 | 43 | 23.58 | 22.90 | 2.76 | 2.47 | 31.24 | ..... | 60 |
| 6.13 | 61 | 39 | 21.36 | 21.51 | 3.66 | 3.70 | 33.36 | 32.00 | 1930 |
| 10.45 | 62 | 38 | 21.41 | 20.00 | 4.74 | 3.71 | 37.75 | 32.00 | 1916 |
| 5.78 | 59 | 41 | *18.61 | 22.00 | 3.69 | 3.30 | 31.38 | 31.00 | 1996 |
| 3.63 | 71 | 29 | 15.90 | 11.00 | 2.37 | 2.50 | 24.70 | 27.00 | 1365 |
| 4.40 | 58 | 42 | *19.02 | 22.00 | 3.75 | 2.40 | 31.80 | 30.00 | 1707 |
| 4.10 | 59 | 41 | 23.48 | 20.00 | 2.69 | 2.50 | 31.12 | 35.00 | 1461 |
| 3.80 | 52 | 48 | 22.32 | 19.00 | 3.98 | 3.71 | 34.77 | 28.00 | 2091 |
| 13.17 | 71 | 29 | *23.39 | 24.59 | *2.96 | 3.30 | 32.85 | 35.00 | 54 |

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*Constituent falls below guaranty.

††$2.75 per cwt.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | NITRATE AGENCIES CO., NEW YORK CITY. | |
| 411 | Ground Bone, | B. R. Watson, Oxford, |
| | J. D. PERKINS, COATESVILLE, PA. | |
| 1012 | Perkins' Pure Bone Meal, | Edw. Tingley, New London, |
| | PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA. | |
| 27 | No. 1 Pure Raw Bone Meal, | W. C. Beckert, Pittsburgh, |
| | Pioneer FERTILIZER CO., CLEVELAND, OHIO. | |
| 19 | Pioneer Bone Meal, | Wm. H. Roadhouse, Greenville, |
| | POLLOCK FERTILIZER CO., THE, BALTIMORE, MD. | |
| 1008 | Soft Ground Bone, | Harvey Spencer, Cochranville, |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | |
| 1926 | Pure Raw Bone (3.50), | W. H. Walker & Co., Kennet Square, |
| | READING BONE FERTILIZER CO., READING, PA. | |
| 48 | Pure Bone Meal, | I. S. Hallman, Skippach, |
| 981 | Pure Raw Bone, | A. R. Kulp, Pottstown, |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | |
| 181 | Royster's Pure Raw Bone Meal, | Abraham Hostetter, Johnstown, |
| | M. L. SHOEMAKER & CO., PHILADELPHIA, PA. | |
| 57 | Swift Sure Bone Meal, | Bennett & Lear, West Chester, |
| | F. W. TUNNELL & CO., INC., PHILADELPHIA, PA. | |
| 1004 | Pure Ground Bone, | R. B. Jackson, Cochranville, |
| | UNITED STATES FERTILIZER CO., THE, BALTIMORE, MD. | |
| 29 | Farm Bell Raw Bone, | Pittsburgh Cut Flower Co., Bakerstown, |
| | VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA. | |
| 1890 | V. C. C. Co.'s Pure Raw Bone, | McCalmont & Co., Bellefonte, |

†Composite sample.

FERTILIZERS—Continued.

| Moisture in 100 pounds. | Mechanical Analysis. | | Chemical Analysis. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Phosphoric Acid. | | Nitrogen. | | | | |
| | Diameter less than 1-50 inch "fine." | Diameter greater than 1-50 inch "coarse." | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 4.03 | 41 | 59 | 24.10 | 22.88 | 2.78 | 2.47 | 30.67 | 30.00 | 411 |
| 6.03 | 68 | 32 | 27.23 | 24.00 | 2.52 | 2.47 | 33.82 | ..... | 1012 |
| 6.03 | 33 | 67 | 22.89 | 22.00 | 4.24 | 3.70 | 34.74 | ††42.00 | 27 |
| 3.00 | 59 | 41 | 24.32 | 24.00 | 2.97 | 2.47 | 32.70 | 30.50 | 19 |
| 7.20 | 49 | 51 | *13.46 | 13.73 | 2.50 | 2.47 | 22.48 | 27.60 | 1008 |
| 2.38 | 72 | 28 | 20.97 | 16.00 | *2.66 | 2.88 | 29.85 | 29.00 | 1926 |
| 7.45 | 38 | 62 | 23.38 | 18.32 | 4.36 | 2.46 | 35.83 | 30.00 | 48 |
| 5.23 | 33 | 67 | 22.29 | 18.32 | 3.52 | 3.29 | 31.51 | 32.00 | 981 |
| 5.63 | 81 | 19 | 22.46 | 21.50 | 3.80 | 3.70 | 36.21 | 32.00 | 131 |
| 3.87 | 56 | 44 | 22.18 | 20.00 | 5.49 | 4.53 | 40.81 | †††45.00 | 57 |
| 12.68 | 56 | 44 | 27.61 | 25.00 | *2.11 | 2.46 | 31.62 | 32.00 | 1004 |
| 6.66 | 55 | 45 | 21.17 | 20.50 | 3.69 | 3.69 | 33.00 | ..... | 29 |
| 5.98 | 51 | 49 | *21.46 | 22.50 | 3.64 | 3.70 | 32.73 | ..... | 1890 |

*Constituent falls below guaranty.
††$2.10 per cwt.
†††$2..[illegible] per cwt.

## MISCELLANEOUS

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | | |
| 904 | †Genuine German Kainit, | Clarence Mickle, Osterburg, | 1.25 |
| 222 | | W. D. Imes, Doyles Mills, | |
| 1009 | | Harvey Spencer, Cochranville, | |
| 126 | Ground Tankage, | O. B. Wertz, Christiana, | 7.73 |
| 1557 | †Muriate of Potash, | Jones Eavenson, Christiana, | .23 |
| 571 | | H. L. Orr, Tyrone, | |
| 1837 | | B. F. Horting, Newport, | |
| 572 | †Nitrate of Soda, | H. L. Orr, Tyrone, | .90 |
| 90 | | W. J. Johnston, Sinking Springs, | |
| 873 | | N. R. Yost, Myerstown, | |
| | ARMOUR FERTILIZER WORKS, BALTIMORE, MD. | | |
| 36 | Muriate of Potash, | Frank Douglass, Indiana, | 1.85 |
| 1142 | †Nitrate of Soda, | A. Skelly, Ebensburg, | 1.08 |
| 1420 | | Peffer & Son, Punxsutawney, | |
| | BAUGH & SONS CO., PHILADELPHIA, PA. | | |
| 678 | †Nitrate of Soda, | Orwell Farmer's Club, Orwell, | 1.40 |
| 579 | | H. L. Stultz & Bro., Altoona, | |
| 1083 | | Jas. G. Kauffman, Dauberville, | |
| 580 | †Genuine German Kainit, | H. L. Stultz & Bro., Altoona, | 1.05 |
| 227 | | John D. Miller, Richfield, | |
| 851 | | A. G. Houtz, Myerstown, | |
| | BOWKER FERTILIZER CO., THE, NEW YORK. | | |
| 1773 | †Muriate of Potash, | M. M. Harter, Nescopeck, | 1.20 |
| 1975 | | Murray & Co., Honesdale, | |
| | CENTRAL CHEMICAL CO., THE, HAGERSTOWN, MD. | | |
| 4 | Nitrate of Soda, | Michael Ickes, Scotland, | .71 |
| | COE MORTIMER CO., THE, NEW YORK. | | |
| 310 | †Muriate of Potash, | I. W. Scott Co., Pittsburgh, | .70 |
| 1049 | | I. W. Scott Co., Pittsburgh, | |
| 742 | †Thomas's Phosphate Powder, | Geo. Walker & Sons, Butler, | .07 |
| 303 | | I. W. Scott Co., Pittsburgh, | |
| 778 | | Union Hardware Co., Mifflinburg, | |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 59 | Muriate of Potash, | Scranton Florist Supp'y Co., Scranton, | 6.74 |
| | GERMAN KALI WORKS, INC., NEW YORK. | | |
| 501 | †Muriate of Potash, | Farmer's Club, Pine Grove, | 7.26 |
| 1743 | | E. F. Hays & Sons, Chicora, | |
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | | |
| 879 | Nitro Crop Feeder, | E. A. Slagle, Paxinos, | 4.58 |
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y. | | |
| 1708 | Nitrate of Soda, | A. S. Lent, Middleburg Center, | .28 |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | | |
| 389 | †Genuine German Kainit, | J. N. Wertz, Bedford, | .15 |
| 219 | | J. K. McLaughlin, Spruce Hill, | |
| 915 | | A. M. McClure, Everett, | |
| 1150 | Muriate of Potash, | Veith Bros., Ebensburg, | .07 |
| 1151 | Nitrate of Soda, | Veith Bros., Ebensburg, | 1.75 |

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†Composite sample.

## FERTILIZERS.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Total. | | | | | Total. | | | | | | |
| Found. | Guaranteed. | Found. | Guaranteed. | Insoluble. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| ...... | ...... | ...... | ...... | ...... | 13.20 | ...... | 13.20 | 12.00 | ...... | ...... | 13.22 | 12.00<br>.....<br>12.00 | 904<br>222<br>1009 |
| ...... | ...... | ...... | 14.12 | 13.73 | ...... | ...... | ...... | ...... | 5.08 | 4.94 | 35.85 | 28.00 | 126 |
| ...... | ...... | ...... | ...... | ...... | 51.82 | ...... | 51.82 | 49.00 | ...... | ...... | 46.03 | 42.50<br>50.00<br>40.25 | 1557<br>571<br>1837 |
| | | | | | | | ...... | ...... | ...... | ...... | ...... | | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.00 | 15.00 | 61.20 | 70.00<br>.....<br>60.00 | 572<br>90<br>873 |
| ...... | ...... | ...... | ...... | ...... | 55.52 | ...... | 55.52 | 48.00 | ...... | ...... | 49.18 | ..... | 36 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.66 | 14.81 | 59.91 | 62.40<br>65.00 | 1142<br>1420 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.10 | 15.23 | 61.57 | .....<br>65.00<br>60.00 | 678<br>579<br>1083 |
| ...... | ...... | ...... | ...... | ...... | 13.02 | ...... | 13.02 | 12.00 | ...... | ...... | 13.05 | 14.00<br>8.00<br>16.00 | 580<br>227<br>851 |
| ...... | ...... | ...... | ...... | ...... | 50.84 | ...... | 50.84 | 49.00 | ...... | ...... | 45.22 | 46.00<br>52.00 | 1778<br>1975 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.98 | 14.04 | 61.20 | ..... | 4 |
| ...... | ...... | ...... | ...... | ...... | 51.68 | ...... | 51.68 | 49.00 | ...... | ...... | 45.95 | 50.00<br>50.00 | 310<br>1049 |
| ...... | ...... | ...... | 18.41 | 17.00 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ..... | 742<br>303<br>778 |
| ...... | ...... | ...... | ...... | ...... | 53.38 | ...... | 53.38 | 49.00 | ...... | ...... | 47.39 | ........ | 59 |
| ...... | ...... | ...... | ...... | ...... | 48.52 | ...... | 48.52 | 48.00 | ...... | ...... | 43.23 | 45.00<br>55.00 | 501<br>1743 |
| ...... | ...... | ...... | ...... | ...... | 4.00 | ...... | 4.00 | 2.50 | *6.36 | 7.50 | 37.44 | 37.00 | 879 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.32 | 15.00 | 62.31 | 60.00 | 1708 |
| ...... | ...... | ...... | ...... | ...... | 13.10 | ...... | 13.10 | 12.00 | ...... | ...... | 13.14 | 13.00<br>.....<br>14.00 | 389<br>219<br>915 |
| ...... | ...... | ...... | ...... | ...... | 53.40 | ...... | 53.40 | 49.00 | ...... | ...... | 47.39 | 47.50 | 1150 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.98 | 15.00 | 61.20 | 60.00 | 1151 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | NATURAL GUANO CO., AURORA, ILL. | | |
| 2221 | Sheep's Head Brand Pulverized Sheep Manure. | Holmes Seed Co., Harrisburg, ....... | 5.25 |
| | NITRATE AGENCIES CO., NEW YORK. | | |
| 1770 | H. A. Brand Basic Slag, Thomas' Phosphate Powder. | C. E. Bronson, Alderson, ............ | .00 |
| 412 | †Muriate of Potash, ...................... | B. R. Watson, Oxford, ............... | .58 |
| 1040 | †Nitrate of Soda, ........................ | C. F. Waltrous, Montrose, ........... | 1.70 |
| 1041 | | C. F. Waltrous, Montrose, ........... | |
| 978 | | J. B. Funk, Palm, .................... | |
| 1767 | | C. E. Bronson, Alderson, ............ | |
| | PULVERIZED MANURE CO., THE, NATIONAL STOCK YARDS, ILL. | | |
| 1293 | †Wizard Brand Manure, ................. | Cochran & Allcock, Carlisle, ........ | 6.95 |
| 2222 | | Walter S. Schell, Harrisburg, ...... | |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | | |
| 1419 | Muriate of Potash, .......................... | Peffer & Son, Punxsutawney, ....... | 20 |
| 115 | Nitrate of Soda, ............................ | Chas. Yaeckle, Patton, .............. | 1.53 |
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 587 | Muriate of Potash, ............................ | Reading Bone Fert. Co., Reading,... | .35 |
| 588 | Nitrate of Soda, ............................ | Reading Bone Fert. Co., Reading,... | 1.48 |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 133 | Muriate of Potash, .......................... | Abraham Hostetter, Johnstown, .... | .70 |
| | SWIFT & CO., BALTIMORE, MD. | | |
| 2123 | Swift's Nitrate of Soda, .................... | E. J. Flynn, Grampian, ............. | .78 |
| | I. P. THOMAS & SONS CO., PHILADELPHIA. | | |
| 281 | Top Dresser for Grass, ..................... | Ed. Shuey, Lickdale, ................. | 10.33 |
| | VIRGINIA CAROLINE CHEMICAL CO., RICHMOND, VA. | | |
| 1197 | Nitrate of Soda. | Geo. Kunkle, Winfield, ............... | 1.60 |
| | YORK CHEMICAL WORKS, YORK, PA. | | |
| 697 | †German Kainit, ............................ | A. P. Lippy, Littlestown, ............ | 1.43 |
| 1865 | | G. W. Schuckman, Duncannon, ..... | |

†Composite sample.

FERTILIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Total. | | | | | Total. | | | | | | |
| Found. | Guaranteed. | Found. | Guaranteed. | Insoluble. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 1.56 | ‡ | .11 | 1.67 | ‡ | 1.80 | ...... | 1.80 | ‡ | 2.50 | ‡ | 18.07 | 25.00 | 2221 |
| ...... | ...... | ...... | *15.77 | 17.00 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ........ | 1770 |
| ...... | ...... | ...... | ...... | ...... | 51.70 | ...... | 51.70 | 50.00 | ...... | ...... | 45.95 | 43.00 | 412 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 50.00 | 1040 |
| | | | | | | | | | | | | 60.00 | 1041 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.84 | 15.00 | 60.65 | 56.00 | 978 |
| | | | | | | | | | | | | 56.25 | 1767 |
| 1.47 | ‡ | .10 | 1.57 | | 2.36 | ...... | 2.36 | ‡ | 2.54 | ‡ | 18.75 | ..... | 1298 |
| | | | | | | | | | | | | 25.00 | 2222 |
| ...... | ...... | ...... | ...... | ...... | 50.18 | ...... | 50.18 | 48.00 | ...... | ...... | 44.67 | 50.00 | 1419 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.92 | 14.82 | 60.83 | 60.00 | 115 |
| ...... | ...... | ...... | ...... | ...... | 51.18 | ...... | 51.18 | 50.00 | ...... | ...... | 45.52 | 48.00 | 587 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.20 | 15.50 | 61.94 | 60.00 | 588 |
| ...... | ...... | ...... | ...... | ...... | 50.50 | ...... | 50.50 | 49.00 | ...... | ...... | 45.93 | 45.00 | 133 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.24 | 14.81 | 62.13 | 60.00 | 2123 |
| ...... | ...... | ...... | ...... | ...... | 4.40 | .96 | 5.36 | 5.00 | 9.06 | 9.04 | 52.56 | 47.50 | 281 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 16.14 | 14.82 | 61.76 | ........ | 1197 |
| ...... | ...... | ...... | ..... | ...... | 13.54 | ...... | 13.54 | 12.40 | ...... | ...... | 13.52 | 13.00 | 697 |
| | | | | | | | ...... | ...... | ...... | ...... | ...... | ..... | 1865 |

*Constituent falls below guaranty.
‡No guaranties furnished by manufacturer.

# INSTRUCTIONS TO AGENTS ENGAGED IN COLLECTING SAMPLING OF FERTILIZERS FOR THE DEPARTMENT OF AGRICULTURE OF PENNSYLVANIA.

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Fertilizer manufacturers sometimes allege that there have been errors made on the part of our sampling agents in selecting samples for analysis. It is due to manufacturers, purchasers and this Department, that the greatest care shall be exercised on the part of all connected with this work, to insure that the samples are fairly taken, are properly labeled and sealed, and are sent to the chemist in exactly the condition in which the goods are found. The following instructions have therefore been prepared for the guidance of agents to which strict adherence is required.

1.—No sample shall be taken from the manufacturer's warehouse.

2.—No agent shall draw in the same season more than two samples of any one brand of fertilizer, unless for some special reason, which he shall state in his report; if a second sample be drawn the agent must satisfy himself that it is not a part of the same shipment from which the first sample was taken.

3.—Each agent shall make report from time to time in duplicate, giving the number of each sample taken in consecutive order, the name and address of the manufacturer, the name and address of the agent selling the goods from which the sample is taken, an EXACT copy of the name of the brand of fertilizer and the selling price per ton of 2,000 lbs. at point of selection. He shall then subscribe his name to each report and send one copy to the official chemist as hereinafter provided, and the other to the Secretary of Agriculture, at Harrisburg, Pa.

4.—Agents shall keep full memoranda of all the samples, stating the number of packages from which the sample is taken, together with such additional notes of information as may be of service for future reference in case the accuracy of their work is called in question.

5.—The sample for analysis must be taken from at least four sacks, the sampling tube to be run its full length diagonally from top to bottom through the center of the sack, turned two or three times to fill it, and the contents emptied upon the oil cloth provided for mixing. Mix the material drawn from the four sacks by lifting the corners of the cloth alternately so as to roll the substance back and forth. Level the well-mixed material with the spatula to a thickness of not more than one inch. By the aid of the spatula divide the flattened heap into quarters, of which two, diagonally opposite shall be scraped from the cloth, and the remaining two remixed by the rolling process and again leveled. Through the heap thus prepared make two channels, crossing at right angles by use of the sampling channel, which must be pushed close to the cloth under the fertilizer and lifted so as to remove a vertical section of the heap. At ONCE, empty the materials thus taken through the funnel into the sampling bottle and screw down tight the bottle cap, after making sure that its cork or fibre cap-lining is in place.

6.—The sample being properly secured, the agent shall write his name and his record number for the sample upon both the bottle and the carton labels. The The bottle shall then be inserted in the carton and the latter IMMEDIATELY closed by drawing down the cover and inserting it in its place and putting a rubber band around the entire carton, the long way so as to hold the cover in place until the agent's seal can be applied.

7.—Place the cartons in the containers and when their number is complete, put on the cover; then place the tape around the container, once each way, and KNOT. Take your sealing wax and seal the tape to the container, by placing the sealing wax directly over the knot so as to secure the knot; then impress your seal and place in shipping case, enclose with them the agent's corresponding duplicate report, lock the case and ship it to the chemist.

8.—Agents must not use pencil in writing upon labels or in Record Book: Provided, however, that indelible pencil may be used if it makes a clearly legible impression and is not used when the paper, by reason of rain or other cause, is so moist as to cause the writing to blur.

9.—Agents, when practicable, will keep the Secretary of Agriculture informed in advance, of the points to be visited, so as to be promptly reached by telegraph or mail, if necessary.

# SPECIAL NOTICE.

This Department expects to continue the publication, early in each year, of a list of fertilizer manufacturers who have complied with the law of this State by filing with the Department the required analysis and paying the legal license fee, together with the trade names of the several brands for which such fees have been paid, so that dealers may be able to avoid making themselves liable to prosecution.

The policy of the Department for some time in the past was to bring prosecution against manufacturers, where it was possible to reach them, rather than against local dealers who are found selling unregistered goods, or goods that in other respects fail to meet the requirements of the law.

It was found, however, that in pursuing this method exclusively, we were sometimes subject to long delays before cases brought, came to trial, and as our witnesses are agents and chemists of the Department who are liable to change, it sometimes happened that before the cases were listed for trial they had gone to some other field and their presence in Court could not be secured.

For this reason prosecutions, when necessary, are now being instituted either against the manufacturers or persons selling goods that do not comply with the law as we may elect.

N. B. CRITCHFIELD,
Secretary of Agriculture.

V 3363.5

Commonwealth of Pennsylvania

BULLETIN No. 243

# FARMERS' INSTITUTES IN PENNSYLVANIA

TO BE HELD UNDER THE
AUSPICES OF

The Pennsylvania Department of Agriculture

COMPILED BY

A. L. MARTIN, Director of Institutes

SEASON 1913-1914.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

# CALENDAR, 1913.

## JANUARY.

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | 1 | 2 | 3 | 4 |
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| 26 | 27 | 28 | 29 | 30 | 31 | .. |

## FEBRUARY.

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## MARCH.

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## APRIL.

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## JUNE.

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## JULY.

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## AUGUST.

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| 31 | .. | .. | .. | .. | .. | .. |

## SEPTEMBER.

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## OCTOBER.

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## NOVEMBER.

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## DECEMBER.

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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | .. | .. | .. |

Commonwealth of Pennsylvania

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BULLETIN No. 243

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# FARMERS' INSTITUTES

## IN PENNSYLVANIA

TO BE HELD UNDER THE
AUSPICES OF

The Pennsylvania Department of Agriculture

COMPILED BY

A. L. MARTIN, Director of Institutes

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SEASON 1913-1914.

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HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1913

JUN 26 1914
CAMBRIDGE, MASS.

Commonwealth of
Pennsylvania

Commonwealth of Pennsylvania

BULLETIN No. 243

# FARMERS' INSTITUTES IN PENNSYLVANIA

To be held under the auspices of the Department of Agriculture
of the State of Pennsylvania during
Season of 1913-14

## ACT OF THE LEGISLATURE OF MARCH 13, 1895.

"Section 5. That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same as to secure the greatest economy and efficiency of service, and to this end he shall, in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with representatives duly appointed by each county agricultural, horticultural and other like organizations with reference to the appointment of speakers and other local arrangements."

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# LETTER OF TRANSMITTAL

## DEPARTMENT OF AGRICULTURE

Harrisburg, Pa., *Aug. 1, 1913.*

Hon. N. B. Critchfield, *Secretary of Agriculture:*

Dear Sir: In accordance with the provisions of the Act creating the Department of Agriculture, I have the honor to present herewith the schedule of Farmers' Institutes of Pennsylvania for the season of 1913-1914; also a complete list of lecturers, with their subjects and their assignments.

Very respectfully,

A. L. MARTIN,
*Director of Institutes.*

* * *

COMMONWEALTH OF PENNSYLVANIA

# DEPARTMENT OF AGRICULTURE

## DIVISION OF INSTITUTES

Harrisburg, Pa., *Aug. 1, 1913.*

To the County Chairmen and Boards of Institute Managers in the Several Counties of Pennsylvania:

Gentlemen: In presenting this annual Bulletin, we desire to express approval of the work accomplished by most of our County Institute Managers and the committees organized by them, to whom much credit is due for the high degree of success attending the last season's Institutes. We respectfully invite your careful attention to "Directions" on the following pages, which are prepared with reference to the requirements and demands of persons filling the position of County Chairman of Institutes.

# INSTITUTE MANAGERS AND PROGRAM COMMITTEES WILL PLEASE READ THE FOLLOWING DIRECTIONS BEFORE ARRANGING PROGRAMS AND CAREFULLY COMPLY WITH SAME IN CONDUCTING INSTITUTES

1. We recommend that programs for all the Institutes held within a county be printed on connected leaves or sheets. This practice is recommended because of economy in cost of printing, also the wider advertising of the different institutes held within the county.

2. Prepare program at least thirty days before the date of Institute.

3. Arrangements should be made with persons in your locality who are to take part on the program either by essay, address or reading, at least eight weeks previous to the meeting.

4. Have a Question Box, and place it in charge of some competent person who will carefully conduct the same.

5. Exclude from Institutes all sectarian and partisan topics.

6. Print on program the name and postoffice address of Chairman and members of Committees.

7. Thoroughly advertise the Institute by distributing programs, invitations postal cards, posters, and make use of your local newspapers.

8. Select a competent secretary to take notes and report proceedings of meeting to local papers.

9. Invite representatives of newspapers to a place at Recording Secretary's table, and solicit their aid and assistance in reporting proceedings of meeting.

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10. For a two-day Institute, provide for five sessions, taking up not more than two topics at any one session, and where local speakers have places on program, the committee should be careful and see to it that their subjects shall conform to the topics under consideration at that particular session.

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11. Locate Institutes where a suitable hall or church can be procured and the greatest number accommodated, as these meetings are for the benefit of farmers and their families and all others who may be interested.

---

12. Extend a personal invitation to your County Superintendent of Public Schools to be present and take part, especially at the educational session, without which no Institute is complete. Invite all farm organizations, school teachers and children. See to it that young men and boys have a special invitation to the Institute.

---

13. At least three State speakers will be in attendance, and a list of topics which they are prepared to discuss can be found in another part of this Bulletin. From this list the Committee on Program should select such topics as would most interest the farmers in their section, and place same opposite the lecturer's name on program.

---

14. The County Chairman should, as soon as arrangements are completed for holding Institute, enclose to all lecturers expected to be present, a copy of program, with letter designating what railroad station to stop at, and the name of the hotel secured for their accommodation. In case Institute is held at a distance from railroad, speakers must be met by conveyances and taken to Institute. The expense of getting from and to such stations is paid from funds placed in hands of County Chairman.

---

15. Remember, the Institute is for the whole county and not merely for the town or locality where held. Begin advertising and do not fail to let the public know of your meeting.

16. The State is divided into five sections. Beginning November 25, five Institutes will be in session at the same time. Three State speakers will be present at all Institutes, one of whom will be a special representative of the Department and have charge of the section, to whom shall be referred all questions relating to local management of Institutes. His decision in such matters shall be final.

17. It is important that the Chairman of County Board of Institute Managers make a complete report and mail same to the Director as soon as possible after the close of the Institutes. Blanks for this purpose will be forwarded him.

18. Attention of Institute Managers and Program Committees is especially called to the plan of assigning speakers in the various sections. The leader of the section will be found at head of tabulated list of Places, and Additional Lecturers will be found at right of places where Institutes will be held. Do not make the mistake as some Committees have done and overlook the leader of the section but place his name on the program in like manner as other speakers are assigned.

19. The County Chairman should take personal charge of the meeting or select a person who is well qualified to fill the position.

20. The opening exercises should be brief, not consuming more than thirty minutes, and may consist of an address of welcome and response, or a brief address by the Chairman introducing the speakers who come from a distance.

21. Two topics thoroughly discussed at one session affords the opportunity for more effective instruction than three or four only partially presented.

22. At Educational Session, confine all discussions to that important subject, whether the speakers be State or local.

23. Where two evening sessions are held, have one devoted to Educational subjects and the other to the interests of the Country Home, its Comforts, Sanitary Conditions and Adornments.

24. Music, properly conducted, is in place at the Institute, but should be introduced as a recreation and be voluntary as no fund is set apart for this purpose.

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25. The amount of money to be distributed to the various managers for local expenses, will be according to the number of days of Institutes held. In order to make the amount ample for the coming season, the sum has been fixed at $12.50 per day of Institute. This provides $25.00 for each two days of Institute, to be used for local expenses, such as printing programs, rent of halls, necessary expenses of local managers, etc. County Chairmen are reimbursed for all reasonable expenses up to $12.50 per day, but no per diem pay is recognized.

## DIRECTIONS FOR CONSTITUTING LOCAL COMMITTEES ON INSTITUTE WORK IN THE SEVERAL COUNTIES OF PENNSLVANIA

The act of March 13, 1895 (Section 5), makes the following provisions: "That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same, as to secure the greatest economy and efficiency of service, and to this end he shall, in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with the representatives duly appointed by each county agricultural, horticultural or other like organizations, with reference to the appointment of speakers and other local arrangements."

In order to carry this provision of the law into effect, the Director of Institutes directs that these representatives, one from each county organization as stated, duly chosen and properly accredited, together with the County Chairman of Institutes, shall constitute a Board of County Institute Managers, of which the County Chairman of Institutes shall be the Chairman of the said Board. The organizations entitled to representation, are members of the State Board of Agriculture, County Agricultural and Horticultural Societies, Pomona Granges and County Alliances.

The duty of this Board shall be to confer and advise with each other and the Director of Institutes, with reference to the appointment of speakers and other local arrangements for holding institutes.

It shall be the duty of each county organization named to notify the Director of Institutes of the appointment of its representatives, and at the same time give a similar notice to the County Chairman of Institutes.

The County Chairman of Institutes, together with these representatives of the county organizations, shall meet for organization on the second Tuesday in June in each year, at one o'clock P. M., in the county town, at the office of the county commissioners. At this meeting the place for holding institutes for the ensuing season shall be selected, the same to be subject to the approval of the Director of Institutes. An institute committee will also be appointed at this time, for each locality in which institutes are to be held.

The County Chairman of Institutes, and each duly accredited representative of the county organizations in attendance upon this meeting shall, upon the certificate of the Chairman of the Board of Managers, be paid his expenses, not to exceed two dollars.

In these meetings every member shall have equal voice, and the action of the majority shall decide. Notice of the action of the Board shall be sent by the Chairman to the Director of Institutes, within ten days after the meeting.

In case no representative from any county organization of that county shall appear at the meeting on the second Tuesday of June, as stated, then the County Chairman of Institutes shall immediately report the fact to the Director of Institutes and proceed to arrange for the holding of institutes that year, without further consultation with the local organizations.

All moneys allotted to any county, for use in institute work, will be paid to the chairman of the local committee, to be accounted for by him in an itemized statement, audited and signed by auditors appointed by the committee, and then forwarded to this Department, not later than the first day of May in each year.

## APPORTIONMENT FOR 1913-1914.

| Section 1 | | Section 2 | | Section 3 | | Section 4. | | Section 5 | | Schools. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COUNTY | Days | COUNTY | Days | COUNTY | Days | COUNTY. | Days | COUNTY. | Days | COUNTY. | Days |
| Adams, | 6 | Bedford, | 6 | Allegheny, | 6 | Bradford, | 8 | Bucks, | 8 | Lebanon, | 4 |
| Cumberland, | 6 | Blair, | 6 | Armstrong, | 6 | Clarion, | 8 | Chester, | 8 | Cumberland, | 4 |
| Dauphin, | 6 | Cambria, | 4 | Butler, | 4 | Clinton, | 6 | Carbon, | 4 | Fulton, | 4 |
| Delaware, | 4 | Centre, | 6 | Beaver, | 6 | Cameron, | 3 | Lehigh, | 6 | Venango, | 4 |
| Franklin, | 8 | Clearfield, | 6 | Crawford, | 8 | Elk, | 4 | Luzerne, | 6 | Lawrence, | 4 |
| Lancaster, | 14 | Fulton, | 4 | Fayette, | 6 | Erie, | 6 | Lackawanna, | 7 | Butler, | 4 |
| Lebanon, | 4 | Huntingdon, | 8 | Greene, | 4 | Forest, | 4 | Monroe, | 6 | Cambria, | 4 |
| Perry, | 4 | Juniata, | 4 | Indiana, | 10 | Jefferson, | 4 | Northampton, | 6 | Columbia, | 5 |
| Philadelphia, | 2 | Mifflin, | 4 | Lawrence, | 6 | Lycoming, | 8 | Pike, | 6 | | |
| York, | 10 | Montour, | 4 | Mercer, | 6 | McKean, | 4 | Schuylkill, | 8 | | |
| Berks, | 8 | Northumberland, | 6 | Washington, | 6 | Potter, | 6 | Wayne, | 8 | | |
| | | Snyder, | 4 | Westmoreland, | 6 | Sullivan, | 4 | Susquehanna, | 8 | | |
| | | Somerset, | 6 | | | Tioga, | 10 | | | | |
| | | Union, | 4 | | | Warren, | 6 | | | | |
| | | | | | | Wyoming, | 4 | | | | |
| | 72 | | 72 | | 74 | | 85 | | 91 | | 33 |

## COMPLETE LIST OF

# PENNSYLVANIA FARMERS' INSTITUTES,

## Season of 1913-14

**GIVING THE COUNTIES IN ALPHABETICAL ORDER AND THE NAME AND ADDRESS OF THE CHAIRMAN OF EACH COUNTY; ALSO POST-OFFICE AND RAILROAD STATION OF PLACE WHERE INSTITUTES ARE HELD**

# DIVISION OF INSTITUTES

| County | Place | Post Office | Railroad Station | Date | Chairman of Institutes |
|---|---|---|---|---|---|
| Adams, | York Springs, | York Springs, | Gradners, | Feb. 13-14, | A. I. Weidner, Arendtsville. |
| | Arendtsville, | Arendtsville, | Biglerville, | Feb. 16-17, | |
| | Fairfield, | Fairfield, | Fairfield, | Feb. 18-19, | |
| Allegheny, | Millerton, | Tarentum, | Tarentum, | Jan. 19-20, | A. J. Purdy, Imperial, R. D. No. 1. |
| | East Union, | Russellton, | Russellton, | Jan. 21-22, | |
| | Carnot, | Coraopolis, | Coraopolis, | Jan. 23-24, | |
| Armstrong, | Dayton, | Dayton, | Dayton, | March 4-5, | S. S. Blyholder, Kelly Station |
| | Elderton, | Elderton, | Kittanning, | March 6-7, | |
| | Spring Church, | Apollo, | Apollo, | March 9-10, | |
| Beaver, | Mt. Pleasant U. P. Church. | New Sheffield, | Woodlawn, | Dec. 17-18, | A. L. McKibben, New Sheffield. |
| | Ohioville, | Beaver, | Industry, | Dec. 19-20, | |
| | New Galilee, | New Galilee, | New Galilee, | Dec. 22-23, | |
| Bedford, | Pleasant Valley, | Bedford, | Yonts, | Dec. 12-13, | W. F. Biddle, Everett, R. D. No. 2. |
| | New Paris, | New Paris, | Fishertown, | Dec. 15-16, | |
| | Osterburg, | Osterburg, | Osterburg, | Dec. 17-18, | |
| Berks, | Womelsdorf, | Womelsdorf, | Womelsdorf, | Jan. 14-15, | H. G. McGowan, Geigers Mills. |
| | Centerport, | Centerport, | Mohrsville, | Jan. 16-17, | |
| | Geigertown, | Geigers Mills, | Geigertown, | Jan. 19-20, | |
| | Jacksonwald, | Jacksonwald, | Reading, | Jan. 21-22, | |
| Blair, | Bellwood, | Bellwood, | Bellwood, | Jan. 12-13, | W. Frank Beck, Altoona, Pa. |
| | Geeseytown, | Hollidaysburg, | Frankstown, | Jan. 14-15, | |
| | West Freedom, | East Freedom, | East Freedom, | Jan. 16-17, | |
| Bradford, | Athens, | Athens, | Athens, | Nov. 25-26, | F. D. Kerrick, Towanda, R. D. No. 3. |
| | Rome, | Rome, | Wysox, | Nov. 28-29, | |
| | Canton, | Canton, | Canton, | Dec. 1-2, | |
| | Troy, | Troy, | Troy, | Dec. 3-4, | |

## DIVISION OF INSTITUTES—Continued.

| County | Place | Post Office | Railroad Station | Date | Chairman of Institutes |
|---|---|---|---|---|---|
| Bucks, | Springtown, | Springtown, | Burgen, | Feb. 25-26, | B. F. Wambold, Sellersville. |
| | Sellersville, | Sellersville, | Sellersville, | Feb. 27-28, | |
| | Doylestown, | Chalfonte, | Chalfonte, | March 2-3, | |
| | Pineville, | Penns Park, | Wycombe, | March 4-5, | |
| Butler, | Slippery Rock, | Slippery Rock, | Keister, | Feb. 25-26, | M. H. Milliron, Euclid. |
| | Prospect, | Prospect, | Isle, | Feb. 27-28, | |
| | Jefferson Grange Hall. | Butler, R. D. No. 7, | West Jefferson, | March 2-3, | |
| | (Movable Institute School, Butler. | Butler, | Butler, | Jan. 5-8, | |
| Cambria, | Patton, | Patton, | Patton, | Feb. 2-3, | L. J. Bearer, Hastings, R. D. |
| | Ebensburg, | Ebensburg, | Ebensburg, | Feb. 4-5, | |
| | (Movable Institute School) Geistown. | Geistown, | Geistown, | Jan. 7-10, | |
| Cameron, | Emporium, | Emporium, | Emporium, | Jan. 21-23, | R. P. Heilman, Emporium. |
| Carbon, | Weatherly, | Weatherly, | Weatherly, | Jan. 12, | Edw. Lienhard, Mauch Chunk, R. D. No. 1. |
| | Big Creek, | Weissport, | Weissport, | Jan. 13, | |
| | New Mahoning, | Lehighton, | Lehighton, | Jan. 14-15, | |
| Center, | Pine Grove Mills, | Pine Grove Mills, | Pine Grove Mills, | Dec. 29-30, | John A. Woodward, Howard. |
| | Rebersburg, | Rebersburg, | Coburn, | Dec. 31-Jan. 1, | |
| | Jacksonville, | Nittany, R. D. No. 3, | Howard, | Jan. 2-3, | |
| Chester, | Oxford, | Oxford, | Oxford, | Jan. 5-6, | M. E. Conard, Westgrove. |
| | Westgrove, | Westgrove, | Westgrove, | Jan. 7-8, | |
| | Byers, | Byers, | Byers, | Jan. 9-10, | |
| | Cedarville, | Pottstown, | Pottstown, | Jan. 12-13, | |
| Clarion, | New Bethlehem, | New Bethlehem, | New Bethlehem. | Feb. 9-10, | J. H. Wilson, Clarion. |
| | Sligo, | Sligo, | Sligo, | Feb. 11-12, | |
| | Foxburg, | Foxburg, | Foxburg, | Feb. 13-14, | |
| | Miola, | Miola, | Clarion, | Feb. 16-17, | |
| Clearfield. | Kerrmoor, | Kerrmoor, | Kerrmoor, | Jan. 5-6, | Harrison Straw, Clearfield. |
| | Goshen, | Clearfield, | Goshen, | Jan. 7-8, | |
| | Karthaus, | Karthaus, | Karthaus, | Jan. 9-10, | |

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|---|---|---|---|---|---|
| Clinton, | Woolrich, | Woolrich, | Lock Haven, | Dec. 29-30, | Joel A. Herr, Millhall. |
| | Loganton, | Loganton, | Loganton, | Dec. 31-Jan. 1, | |
| | Beech Creek, | Beech Creek, | Beech Creek, | Jan. 2-3, | |
| Columbia, | (Movable Institute School) Bloomsburg.. | Bloomsburg, | Bloomsburg, | Jan. 12-16, | A. P. Young, Millville. |
| Crawford, | Moslertown, | Saegerstown, | Saegerstown, | Feb. 2-3, | J. F. Seavy, Saegerstown. |
| | Blooming Valley, | Blooming Valley, | Meadville, | Feb. 4-5, | |
| | Conneaut Lake, | Conneaut Lake, | Summit Station, | Feb. 6-7, | |
| | Atlantic, | Atlantic, | Atlantic, | Feb. 9-10, | |
| Cumberland, | Newburg, | Newburg, | Shippensburg, | Jan. 7, | T. J. Ferguson, Mechanicsburg. |
| | Oakville, | Oakville, | Oakville, | Jan. 8-9, | |
| | Hogestown, | Hogestown, | Mechanicsburg, | Jan. 10, | |
| | New Cumberland, | New Cumberland, | New Cumberland, | Jan. 12-13, | |
| | (Movable Institute School) Centreville. | Dickinson, | Longsdorf, | Dec. 3-6, | |
| Dauphin, | Middletown, | Middletown, | Middletown, | Nov. 28-29, | E. S. Keiper, Middletown. |
| | Gratz, | Gratz, | Elizabethville, | Dec. 1-2, | |
| | Linglestown, | Linglestown, | Harrisburg, | Dec. 3-4, | |
| Delaware, | Media, | Media, | Media, | March 2-3, | E. J. Durnall, Swarthmore. |
| | Concordville, | Concordville, | Concordville, | March 4-5, | |
| Elk, | St. Marys, | St. Marys, | St. Marys, | Jan. 5-6, | John G. Schmidt, St. Marys. |
| | Kersey, | Kersey, | Kersey, | Jan. 7-8, | |
| Erie, | Woles Church, | Harbor Creek, | Harbor Creek, | Feb. 2-3, | Archie Billings, Edinboro. |
| | Millvillage, | Millvillage, | Millvillage, | Feb. 4-5, | |
| | Lundys Lane, | Lundys Lane, | Albion, | Feb. 6-7, | |
| Fayette, | Dunbar, | Dunbar, | Dunbar, | Dec. 10-11, | John T. Smith, Dunbar, R. D. No. 32. |
| | Smock, | Smock, | Smock, | Dec. 12-13, | |
| | Perryopolis, | Perryopolis, | Layton, | Dec. 15-16, | |
| Forest, | Marionville, | Marionville, | Marionville, | Feb. 18-19, | C. A. Randall, Tionesta. |
| | Tionesta, | Tionesta, | Tionesta, | Feb. 20-21, | |
| Franklin, | Scotland, | Scotland, | Scotland, | Feb. 20-21, | J. P. Young, Marion. |
| | Marion, | Marion, | Marion, | Feb. 23-24, | |
| | Waynesboro, | Waynesboro, | Waynesboro, | Feb. 25-26, | |
| | Dry Run, | Dry Run, | Richmond, | Feb. 27-28, | |
| Fulton, | Houstontown, | Houstontown, | Mercersburg, | Nov. 28-29, | Frank Rauck, Hancock, Md. |
| | Enid, | Enid, | Mercersburg, | Dec. 1-2, | |
| | (Movable Institute School) Needmore. | Needmore, | Hancock, Md., | Dec. 5-9, | |
| Greene, | Pine Bank, | Pine Bank, | Waynesburg, | Nov. 28-29, | J. W. Stewart, Jefferson. |
| | Sycamore, | Sycamore, | Sycamore, | Dec. 1-2, | |

## DIVISION OF INSTITUTES—Continued.

| County | Place | Post Office | Railroad Station | Date | Chairman of Institutes |
|---|---|---|---|---|---|
| Huntingdon, | Orbisonia, | Orbisonia, | Rock Hill, | Dec. 3-4, | G. G. Hutchison, Warriors Mark. |
| | McAlevys Fort, | McAlevys Fort, | Petersburg, | Dec. 5-6, | |
| | Warriors Mark, | Warriors Mark, | Warriors Mark, | Dec. 8-9, | |
| | Markelsburg, | James Creek, | Markelsburg, | Dec. 10-11, | |
| Indiana, | Smicksburg, | Smicksburg, | Goodville, | Dec. 29-30, | S. C. George, West Lebanon. |
| | Marion Center, | Marion Center, | Marion Center, | Dec. 31-Jan. 1, | |
| | Willet, | Creekside, | Creekside, | Jan. 2-3, | |
| | Brushvalley, | Brushvalley, | Homer City, | Jan. 5-6, | |
| | Lewisville, | Livermore, | Livermore, | Jan. 7-8, | |
| Jefferson, | Ringgold, | Ringgold, | | Jan. 9-10, | Peter B. Cowan, Brookville. |
| | Baxter, | Baxter, | Baxter, | Jan. 12-13, | |
| Juniata, | McAlisterville, | McAlisterville, | Mifflin, | March 4-5, | Matthew Rodgers, Mexico. |
| | Port Royal, | Port Royal, | Port Royal, | March 6-7, | |
| Lackawanna, | Tompkinsville, | Jermyn, | Jermyn, | Dec. 27, | Horace Seamans, Factoryville. |
| | Daleville, | Daleville, | Moscow, | Dec. 29-30, | |
| | Madisonville | Madisonville, | Moscow, | Dec. 31-Jan. 1, | |
| | Bald Mount, | Bald Mount, | Clarks Summit, | Jan. 2, | |
| | Clarks Summit, | Clarks Summit, | Clarks Summit, | Jan. 3, | |
| Lancaster, | Maytown, | Maytown, | Marietta, | Dec. 5-6, | J. Aldus Herr, Lancaster, R. D. No. 4.<br>E. K. Hibshman, Ephrata. |
| | Mechanicsville, | Manheim, | Manheim, | Dec. 8-9, | |
| | Lititz, | Lititz, | Lititz, | Dec. 10-11, | |
| | Ephrata, | Ephrata, | Ephrata, | Dec. 12-13, | |
| | Lampeter, | Lampeter, | Lampeter, | Dec. 15-16, | |
| | Paradise, | Paradise, | Paradise, | Dec. 17-18, | |
| | Millersville, | Millersville, | Lancaster, | Dec. 19, | |
| | Blue Ball, | Blue Ball, | East Earl, | Dec. 20, | |
| Lawrence, | Bethel Church, | | | Feb. 18-19, | Sylvester Shaffer, New Castle, R. D. No. 4. |
| | Herman Church, | New Castle, | Gibsondale, | Feb. 20-21, | |
| | Plaingrove, | Volant, | Brent, | Feb. 23-24, | |
| | (Movable Institute School) Westfield. | Mahoningtown, | Mahoningtown, | Dec. 31-Jan. 3, | |
| Lebanon, | Annville, | Annville, | Annville, | Jan. 2-3, | Edward Shuey, Lickdale. |
| | Schaefferstown, | Schaefferstown, | Richland, | Jan. 5-6, | |
| | (Movable Institute School) Jonestown. | Jonestown, | Jonestown, | Dec. 1-4, | |

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|---|---|---|---|---|---|
| Lehigh, | Macungie, | Macungie, | Macungie, | Feb. 9-10, | P. S. Fenstermaker, Allentown. |
| | Laurys, | Laurys, | Laurys, | Feb. 11-12, | |
| | New Tripoli, | New Tripoli, | New Tripoli, | Feb. 13-14, | |
| Luzerne, | Dallas, | Dallas, | Dallas, | Jan. 5-6, | J. E. Hildebrant, Dallas. |
| | Town Line, | Town Line, | Shickshinny, | Jan. 7-8, | |
| | Conyngham, | Conyngam, | Conyngham, | Jan. 9-10, | |
| Lycoming, | Pinerun, | | Level Corners, | Feb. 27-28, | A. J. Kahler, Hughesville. |
| | Limestone, | Branchtown, | | March 2-3, | |
| | Warrensville, | Warrensville, | Warrensville, | March 4-5, | |
| | Hughesville, | Hughesville, | Hughesville, | March 6-7, | |
| McKean, | Crosby, | Crosby, | Crosby, | Feb. 23, | E. A. Studholme, Smethport. |
| | Farmers Valley, | Farmers Valley, | Farmers Valley, | Feb. 24, | |
| | Eldred, | Eldred, | Eldred, | Feb. 25, | |
| | Turtle Point, | Turtle Point, | Turtle Point, | Feb. 26, | |
| Mercer, | Transfer, | Transfer | Transfer, | Feb. 11-12, | Wm. C. Black, Mercer. |
| | Jackson Center, | Jackson Center, | Jackson Center, | Feb. 13-14, | |
| | Mercer, | Mercer, | Mercer, | Feb. 16-17, | |
| Mifflin, | McVeytown, | McVeytown, | McVeytown, | Feb. 6-7, | M. M. Nagney, Milroy. |
| | Milroy, | Milroy, | Milroy, | Feb. 9-10, | |
| Monroe, | Kunkletown, | Kunkletown, | Kunkletown, | Jan. 16-17, | F. S. Brong, Saylorsburg. |
| | Canadensis, | Canadensis, | Cresco, | Jan. 19-20, | |
| | Effort, | Effort, | Stroudsburg, | Jan. 21-22, | |
| Montgomery, | Trappe, | Trappe, | Collegeville, | Jan. 14-15, | J. H. Schultz, No. 506 Hamilton St., Norristown. |
| | Centre Point, | Worcester, | Norristown, | Jan. 16-17, | |
| | Schwenkville, | Schwenkville, | Schwenkville, | Jan. 19-20, | |
| | Harleysville, | Harleysville, | Souderton, | Jan. 21-22, | |
| | East Greenville, | East Greenville, | East Greenville, | Jan. 23-24, | |
| Montour, | Exchange, | Exchange, | Ottawa, | Feb. 27-28, | J. Miles Derr, Milton, R. D. No. 1. |
| | Grovania, | Grovania, | Danville, | March 2-3, | |
| Northampton, | Bangor, | Bangor, | Bangor, | Feb. 2-3, | C. S. Messinger, Tatamy. |
| | Nazareth, | Nazareth, | Nazareth, | Feb. 4-5, | |
| | Cherryville, | Cherryville, | Treichlers, | Feb. 6-7, | |
| Northumberland, | Rebuck, | Rebuck, | Herndon, | Feb. 20-21, | I. A. Eschbach, Milton, R. D. No. 1. |
| | Pottsgrove, | Pottsgrove, | Pottsgrove, | Feb. 23-24, | |
| | McEwensville, | McEwensville, | McEwensville, | Feb. 25-26, | |
| Philadelphia, | Bustleton, | Bustleton, | Bustleton, | Feb. 23-24, | S. K. Foster, Torresdale. |
| Perry, | Landisburg, | Landisburg, | Greenpark, | Dec. 29-30, | C. M. Bower, Blain. |
| | Ickesburg, | Ickesburg, | Loysville, | Dec. 31-Jan. 1, | |
| Pike, | Paupack, | Paupack, | Hawley, | Dec. 17-18, | B. F. Killam, Paupack. |
| | Greentown, | Greentown, | Gouldsboro, | Dec. 19-20, | |
| | Egypt Mills, | Egypt Mills, | Bushkill, | Jan. 23-24, | |

## DIVISION OF INSTITUTES—Continued.

| County | Place | Post Office | Railroad Station | Date | Chairman of Institutes |
|---|---|---|---|---|---|
| Potter, | Ulysses, | Ulysses, | Ulysses | Dec. 17-18, | A. T. Crittenden, Oswayo. |
| | Gold, | Gold, | Gold, | Dec. 19-20, | |
| | Sweden Valley, | Coudersport, | Coudersport, | Dec. 22-23, | |
| Schuylkill, | Friedensburg, | Friedensburg, | Schuylkill Haven, | Feb. 16-17, | John Shoener, New Ringgold. |
| | Valley View, | Valley View, | Good Spring, | Feb. 18-19, | |
| | Barnesville, | Barnesville, | Barnesville, | Feb. 20-21, | |
| | Lewistown, | Tamaqua, | Tamaqua, | Feb. 23-24, | |
| Snyder, | Beavertown, | Beavertown, | Beavertown, | Feb. 11-12, | F. F. Glass, Freeburg. |
| | Freeburg, | Freeburg, | Selinsgrove, | Feb. 13-14, | |
| Somerset, | Boswell, | Boswell, | Boswell, | Jan. 19-20, | J. C. Weller, Rockwood. |
| | Somerset, | Somerset, | Somerset, | Jan. 21-22, | |
| | Salisbury, | Elk Lick, | Meyersdale, | Jan. 23-24, | |
| Sullivan, | Muncy Valley, | Muncy Valley, | Muncy Valley, | March 9-10, | E. R. Warburton, Campbellville. |
| | Colley, | Colley, | Dushore, | March 11-12, | |
| Susquehanna, | West Auburn, | West Auburn, | Laceyville, | Nov. 29-30, | F. A. Davies, Montrose. |
| | Rush, | Rush, | Montrose, | Dec. 1-2, | |
| | South Montrose, | South Montrose, | South Montrose, | Dec. 3-4, | |
| | Gibson, | Gibson, | New Milford, | Dec. 5-6, | |
| Tioga, | Liberty, | Liberty, | Roaring Branch, | Dec. 5-6, | C. H. DeWitt, Mansfield. |
| | Mansfield, | Mansfield, | Mansfield, | Dec. 8-9, | |
| | Mitchells Mills, | Millerton, | Trobridge, | Dec. 10-11, | |
| | Tioga, | Tioga, | Tioga, | Dec. 12, | |
| | Wellsboro, | Wellsboro, | Wellsboro, | Dec. 13, | |
| | Westfield, | Westfield, | Westfield, | Dec. 15-16, | |
| Union, | Mifflinburg, | Mifflinburg, | Mifflinburg, | Feb. 16-17, | J. Newton Glover, Vicksburg. |
| | Winfield, | Winfield, | Winfield, | Feb. 18-19, | |
| Venango, | (Movable Institute School) Franklin. | Franklin, | Franklin, | Dec. 29-Jan. 1, | W. A. Crawford, Cooperstown. |
| Warren, | Russell, | Russell, | Russell, | Jan. 14-15, | G. A. Woodside, Sugargrove. |
| | Sugargrove, | Sugargrove, | Youngsville, | Jan. 16-17, | |
| | Lottsville, | Lottsville, | Pittsfield, | Jan. 19-20, | |

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|---|---|---|---|---|---|
| Washington, | Claysville, | Claysville, | Claysville, | Dec. 3-4, | D. S. Taylor, Burgettstown. |
| | Washington, | Washington, | Washington, | Dec. 5-6, | |
| | Hickory, | Hickory, | Hickory, | Dec. 8-9, | |
| Wayne, | Honesdale, | Honesdale, | Honesdale, | Dec. 8-9, | W. E. Perham, Pleasant Mount. |
| | Waymart, | Waymart, | Waymart, | Dec. 10-11, | |
| | Ariel, | Ariel, | Ariel, | Dec. 12-13, | |
| | Sterling, | Sterling, | Moscow, | Dec. 15-16, | |
| Westmoreland, | Latrobe, | Latrobe, | Latrobe, | Jan. 9-10, | W. F. Holtzer, Greensburg. |
| | Greensburg, | Greensburg, | Greensburg, | Jan. 12-13, | |
| | Scottdale, | Scottdale, | Scottdale, | Jan. 14-15, | |
| | Irwin, | Irwin, | Irwin, | Jan. 16-17, | |
| Wyoming, | Meshoppen, | Meshoppen, | Meshoppen, | March 13-14, | G. A. Benson, Tunkhannock. |
| | Tunkhannock, | Tunkhannock, | Tunkhannock, | March 16-17, | |
| York, | Lewisberry, | Lewisberry, | Goldsboro, | Jan. 30-31, | G. F. Barnes, Rossville. |
| | Loganville, | Loganville, | Gladfelters, | Feb. 2-3, | |
| | Fawn Grove, | Fawn Grove, | Fawn Grove, | Feb. 4-5, | |
| | Red Lion, | Red Lion, | Red Lion, | Feb. 6-7, | |
| | Dover, | Dover, | Dover, | Feb. 9-10, | |
| | Wellsville, | Wellsville, | Dillsburg, | Feb. 11-12, | |

# PENNSYLVANIA FARMERS' INSTITUTES

## ASSIGNMENTS OF LECTURERS BY SECTIONS FOR 1913-14

### FIRST SECTION

D. H. WATTS will attend all meetings in this section.

| Date. | Place. | County. | Additional Lecturers. |
|---|---|---|---|
| Nov. 28, | Middletown, | Dauphin, | C. C. Hulsart and J. H. Peachey. |
| Nov. 29, | Middletown, | Dauphin, | C. C. Hulsart, J. H. Peachey and Dr. A. Holmes. |
| Dec. 1-2, | Gratz, | Dauphin, | C. C. Hulsart and J. H. Peachey. |
| Dec. 3-4, | Linglestown, | Dauphin, | C. C. Hulsart and J. H. Peachey. |
| Dec. 5-6, | Maytown, | Lancaster, | C. C. Hulsart, J. H. Peachey, Frank Kline and E. K. Hibshman. |
| Dec. 8-9, | Mechanicsville, | Lancaster, | C. C. Hulsart, Prof. W. H. Tomhave, Frank Kline and E. K. Hibshman. |
| Dec. 10-11, | Lititz. | Lancaster, | C. C. Hulsart, Prof. W. H. Tomhave, Frank Kline and E. K. Hibshman. |
| Dec. 12-13, | Ephrata, | Lancaster, | C. C. Hulsart, Prof. W. H. Tomhave, FrankKline and E. K. Hibshman. |
| Dec. 15-16, | Lampeter, | Lancaster, | C. C. Hulsart, B. O. Severson, Frank Kline and E. K. Hibshman. |
| Dec. 17-18, | Paradise, | Lancaster, | C. C. Hulsart, B. O. Severson, Frank Kline and E. K. Hibshman. |
| Dec. 19, | Millersville, | Lancaster, | C. C. Hulsart, B. O. Severson, Frank Kline and E. K. Hibshman. |
| Dec. 20, | Blue Ball, | Lancaster, | C. C. Hulsart, B. O. Severson, Frank Kline and E. K. Hibshman. |
| Dec. 29-30, | Landisburg, | Perry, | Howard Mitman and Sheldon W. Funk. |
| Dec. 31, Jan. 1, | Ickesburg, | Perry, | Howard Mitman and Sheldon W. Funk. |
| Jan. 2-3, | Annville, | Lebanon, | Howard Mitman and Sheldon W. Funk. |
| Jan. 5-6, | Schaefferstown, | Lebanon, | Howard Mitman and Sheldon W. Funk. |
| Jan. 7, | Newburg, | Cumberland, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 8-9, | Oakville, | Cumberland, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 10, | Hogestown, | Cumberland, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 12-13, | New Cumberland, | Cumberland, | H M. Anderson and Sheldon W. Funk. |
| Jan. 14-15, | Womelsdorf, | Berks, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 16-17, | Centerport, | Berks, | H. M. Anderson and Sheldon W. Funk. |

| Date. | Place. | County. | Additional Lecturers. |
|---|---|---|---|
| Jan. 19-20, | Geigertown, | Berks, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 21-22, | Jacksonwald, | Berks, | H. M. Anderson and Sheldon W. Funk. |
| Jan. 23-24, | Bustleton, | Philadelphia, | H. M. Anderson and Chas. T. Cornman. |
| Jan. 30-31, | Lewisberry, | York, | E. B. Dorsett, C. M. Barnitz and H. R. Kraybill. |
| Feb. 2-3, | Loganville, | York, | E. B. Dorsett, C. M. Barnitz and H. R. Kraybill. |
| Feb. 4-5, | Fawn Grove, | York, | E. B. Dorsett, C. M. Barnitz and H. R. Kraybill. |
| Feb. 6-7, | Red Lion, | York, | E. B. Dorsett, C. M. Barnitz and H. R. Kraybill. |
| Feb. 9-10, | Dover, | York, | E. B. Dorsett, C. M. Barnitz and H. R. Kraybill. |
| Feb. 11-12, | Wellsville, | York, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 13-14, | York Springs, | Adams, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 16-17, | Ardentsville, | Adams, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 18-19, | Fairfield, | Adams, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 20-21, | Scotland, | Franklin, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 23-24, | Marion, | Franklin, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 25-26, | Waynesboro, | Franklin, | E. B. Dorsett and C. M. Barnitz. |
| Feb. 27-28, | Dry Run, | Franklin, | E. B. Dorsett and C. M. Barnitz. |
| March 2-3, | Media, | Delaware, | E. B. Dorsett and C. M. Barnitz. |
| March 4-5, | Concordville, | Delaware, | E. B. Dorsett and C. M. Barnitz. |

## SECOND SECTION

**PROF. FRANKLIN MENGES** will attend all meetings in this section.

| | | | |
|---|---|---|---|
| Nov. 28-29, | Houstontown, | Fulton, | W. M. Patton and J. B. Johnston. |
| Dec. 1-2, | Enid, | Fulton, | W. M. Patton and J. B. Johnston. |
| Dec. 3-4, | Orbisonia, | Huntingdon, | W. M. Patton and J. B. Johnston. |
| Dec. 5-6, | McAlevys Fort, | Huntingdon, | W. M. Patton and J. B. Johnston. |
| Dec. 8-9, | Warriors Mark, | Huntingdon, | W. M. Patton and F. H. Fassett. |
| Dec. 10-11, | Marklesburg, | Huntingdon, | W. M. Patton and F. H. Fassett. |
| Dec. 12-13, | Pleasant Valley, | Bedford, | W. M. Patton and H. M. Gooderham. |
| Dec. 15-16, | New Paris, | Bedford, | W. M. Patton and H. M Gooderham. |
| Dec. 17-18, | Osterburg, | Bedford, | W. M. Patton and H. M. Gooderham. |
| Dec. 29-30, | Pine Grove Mills, | Center, | R. H. Bell and H. M. Gooderham. |
| Dec 31, Jan. 1, | Rebersburg, | Center, | R. H. Bell and H. M. Gooderham. |
| Jan. 2-3, | Jacksonville, | Center, | R. H. Bell and H. M. Gooderham. |
| Jan. 5-6, | Kerrmoor, | Clearfield, | J. Stuart Groupe and H. M. Gooderham. |
| Jan 7-8, | Goshen, | Clearfield, | J. Stuart Groupe and H. M. Gooderham. |

| Date. | | Place. | County. | Additional Lecturers. |
|---|---|---|---|---|
| Jan. | 9-10, | Karthaus, | Clearfield, | J. Stuart Groupe and H. M. Gooderham. |
| Jan. | 12-13, | Bellwood, | Blair, | J. Stuart Groupe and E. B. Dorsett. |
| Jan | 14-15, | Geeseytown, | Blair, | J. Stuart Groupe and E. B. Dorsett. |
| Jan. | 16-17, | East Freedom, | Blair, | J. Stuart Groupe and E. B. Dorsett. |
| Jan. | 19-20, | Boswell, | Somerset, | Robert S. Seeds and E. B. Dorsett. |
| Jan. | 21-22, | Somerset, | Somerset, | Robert S. Seeds and E. B. Dorsett. |
| Jan. | 23-24, | Salisbury, | Somerset, | Robert S. Seeds and E. B. Dorsett. |
| Feb. | 2-3, | Patton, | Cambria, | Sheldon W. Funk and E. L. Phillips. |
| Feb. | 4-5, | Ebensburg, | Cambria, | Sheldon W. Funk and E. L. Phillips. |
| Feb. | 6-7, | McVeytown, | Mifflin, | Sheldon W. Funk and E. L. Phillips. |
| Feb. | 9-10, | Milroy, | Mifflin, | Sheldon W. Funk and E. L. Phillips. |
| Feb. | 11-12, | Beavertown, | Snyder, | Sheldon W. Funk, E. L. Phillips and Leon Otice Van Noy . |
| Feb. | 13-14, | Freeburg, | Snyder, | Sheldon W. Funk, E. L. Phillips and Leon Otice Van Noy . |
| Feb. | 16-17, | Mifflinburg, | Union, | Sheldon W. Funk, E. L. Phillips and Leon Otice Van Noy . |
| Feb. | 18-19, | Winfield, | Union, | Sheldon W. Funk, E. L. Phillips and Leon Otice Van Noy. |
| Feb. | 20, | Rebuck, | Northumberland, | Sheldon W. Funk, E. L. Phillips and Hon. Henry Houck. |
| Feb. | 21, | Rebuck, | Northumberland, | Sheldon W. Funk and E. L. Phillips. |
| Feb. | 23, | Pottsgrove, | Northumberland, | Sheldon W. Funk and Chas. T. Cornman. |
| Feb. | 24, | Pottsgrove, | Northumberland, | Sheldon W. Funk, Chas. T. Cornman and Dr. Hannah McK. Lyons. |
| Feb. | 25, | McEwensville, | Northumberland, | Sheldon W. Funk, Chas. T. Cornman and Dr. Hannah McK. Lyons. |
| Feb. | 26, | McEwensville, | Northumberland, | Sheldon W. Funk and Chas. T. Cornman. |
| Feb. | 27-28, | Exchange, | Montour, | Sheldon W. Funk and Chas. T. Cornman. |
| March | 2-3, | Grovania, | Montour, | F. H. Fassett and Chas. T. Cornman. |
| March | 4-5, | McAllisterville, | Juniata, | F. H. Fassett and Chas. T. Cornman. |
| March | 6-7, | Port Royal, | Juniata, | F. H. Fassett and Chas. T. Cornman. |

## THIRD SECTION

J. T. CAMPBELL will attend all meetings in this section.

| | | | | |
|---|---|---|---|---|
| Nov. | 28-29, | Pine Bank, | Greene, | Sheldon W. Funk, H. P. Davis and M. H. McCallum. |
| Dec. | 1-2, | Sycamore, | Greene, | Sheldon W. Funk, H. P. Davis and M. H. McCallum. |
| Dec. | 3-4, | Claysville, | Washington, | Sheldon W. Funk, H. P. Davis and M. H. McCallum. |
| Dec. | 5-6, | Washington, | Washington, | Sheldon W. Funk, H. P. Davis and M. H McCallum. |

| Date. | Place. | County. | Additional Lecturers. |
|---|---|---|---|
| Dec. 8-9, | Hickory, | Washington, | Sheldon W. Funk, E. L. Worthen and M. H. McCallum. |
| Dec. 10-11, | Dunbar, | Fayette, | Sheldon W. Funk, E. L. Worthen and M. H. McCallum. |
| Dec. 12-13, | Smock, | Fayette, | Sheldon W. Funk, E. L. Worthen and M. H. McCallum. |
| Dec. 15-16, | Perryopolis, | Fayette, | Sheldon W. Funk and E. B. Dorsett. |
| Dec. 17-18, | Mt. Pleasant, | Beaver, | Sheldon W. Funk and E. B. Dorsett. |
| Dec. 19-20, | Ohioville, | Beaver, | Sheldon W. Funk and E. B. Dorsett. |
| Dec. 22-23, | New Galilee, | Beaver, | Sheldon W. Funk and E. B. Dorsett. |
| Dec. 29-30, | Smicksburg, | Indiana, | Leon Otice Van Noy and J. H. Peachey. |
| Dec. 31, Jan. 1, | Marion Center, | Indiana, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 2, | Willet, | Indiana, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 3, | Willet, | Indiana, | Leon Otice Van Noy, J. H. Peachey and Robt. S. Seeds. |
| Jan. 5, | Brushvalley, | Indiana, | Leon Otice Van Noy, J. H. Peachey and Robt. S. Seeds. |
| Jan. 6, | Brushvalley, | Indiana, | Leon Otice Van Noy, J. H. Peachey and Dr. Hannah McK. Lyons. |
| Jan. 7, | Lewisville, | Indiana, | Leon Otice Van Noy, J. H. Peachey and Dr. Hannah McK. Lyons. |
| Jan. 8, | Lewisville, | Indiana, | Leon Otice Van Noy and J. H. Peachy. |
| Jan. 9, | Latrobe, | Westmoreland, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 10, | Latrobe, | Westmoreland, | Leon Otice Van Noy, J. H. Peachey and Robt. S. Seeds. |
| Jan. 12, | Greensburg, | Westmoreland, | Leon Otice Van Noy, J. H. Peachey and Robt. S. Seeds. |
| Jan. 13, | Greensburg, | Westmoreland, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 14-15, | Scottdale, | Westmoreland, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 16-17, | Irwin, | Westmoreland, | Leon Otice Van Noy and J. H. Peachey. |
| Jan. 19-20, | Millerton, | Allegheny, | Leon Otice Van Noy and Fred S. Putney. |
| Jan. 21-22, | East Union, | Allegheny, | Leon Otice Van Noy and Fred S. Putney. |
| Jan. 23-24, | Carnot, | Allegheny, | Leon Otice Van Noy and Fred S. Putney. |
| Feb. 2-3, | Mosiertown, | Crawford, | Leon Otice Van Noy and J. H. Peachey. |
| Feb. 4-5, | Blooming Valley, | Crawford, | Leon Otice Van Noy and J. H. Peachey. |
| Feb. 6-7, | Conneaut Lake, | Crawford, | Leon Otice Van Noy and J. H. Peachey. |
| Feb. 9-10, | Atlantic, | Crawford, | W. D. Zinn and H. H. Havner. |
| Feb. 11-12, | Transfer, | Mercer, | W. D. Zinn and H. H. Havner. |
| Feb. 13-14, | Jackson Center, | Mercer, | W. D. Zinn and H. H. Havner. |
| Feb. 16-17, | Mercer, | Mercer, | W. D. Zinn and W. H. Tomhave. |
| Feb. 18-19, | Bethel Church, | Lawrence, | W. D. Zinn and M. H. McCallum. |

| Date. | | Place. | County. | Additional Lecturers. |
|---|---|---|---|---|
| Feb. | 20-21, | Herman Church, | Lawrence, | W. D. Zinn, M. H. McCallum and Leon Otice Van Noy. |
| Feb. | 23-24, | Plaingrove, | Lawrence, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| Feb. | 25-26, | Slippery Rock, | Butler, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| Feb. | 27-28, | Prospect, | Butler, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| March | 2-3, | Jefferson Grange, | Butler, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| March | 4-5, | Dayton, | Armstrong, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| March | 6-7, | Elderton, | Armstrong, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |
| March | 9-10, | Spring Church, | Armstrong, | W. M. Patton, M. H. McCallum and Leon Otice Van Noy. |

## FOURTH SECTION

**R. P. KESTER** will attend all meetings in this section.

| | | | | |
|---|---|---|---|---|
| Nov. | 25-26, | Athens, | Bradford, | W. Theo. Wittman, Chas. A. Row, Prof. F. R. Stevens and Mrs. Jean Kane Foulke. |
| Nov. | 28-29, | Rome, | Bradford, | W. Theo. Wittman, Chas. A. Row, Prof. F. R. Stevens and Mrs. Jean Kane Foulke. |
| Dec. | 1-2, | Canton, | Bradford, | Chas. A. Row, Mrs. Jean Kane Foulke and David E. Warner. |
| Dec. | 3-4, | Troy, | Bradford, | Chas. A. Row, Mrs. Jean Kane Foulke and David E. Warner. |
| Dec. | 5-6, | Liberty, | Tioga, | Chas. A. Row, Mrs. Jean Kane Foulke and David E. Warner. |
| Dec. | 8-9, | Mansfield, | Tioga, | E. L. Phillips, Chas. A. Row and Mrs. Jean Kane Foulke. |
| Dec. | 10-11, | Mitchells Mills, | Tioga, | E. L. Phillips, Chas. A. Row and Mrs. Jean Kane Foulke. |
| Dec. | 12, | Tioga, | Tioga, | E. L. Phillips, Chas. A. Row and Mrs. Jean Kane Foulke. |
| Dec. | 13, | Wellsboro, | Tioga, | E. L. Phillips, Chas. A. Row and Mrs. Jean Kane Foulke. |
| Dec. | 15-16, | Westfield, | Tioga, | E. L. Phillips, R. J. Weld and Mrs. Jean Kane Foulke. |
| Dec. | 17-18, | Ulysses, | Potter, | E. L. Phillips, R. J. Weld and Mrs. Jean Kane Foulke. |
| Dec. | 19-20, | Gold, | Potter, | E. L. Phillips, R. J. Weld and Mrs. Jean Kane Foulke. |
| Dec. | 22-23, | Sweden Valley, | Potter, | E. L. Phillips, R. J. Weld and Mrs. Jean Kane Foulke. |
| Dec. | 29-30, | Woolrich, | Clinton, | Frank Kline and Mrs. Jean Kane Foulke. |

| Date. | Place. | County. | Additional Lecturers. |
|---|---|---|---|
| Dec. 31, Jan. 1, | Logantown, | Clinton, | Frank Kline and Mrs. Jean Kane Foulke. |
| Jan. 2-3, | Beech Creek, | Clinton, | Frank Kline and Mrs. Jean Kane Foulke. |
| Jan. 5-6, | St. Marys, | Elk, | Frank Kline and W. H Stout. |
| Jan. 7-8, | Kersey, | Elk, | Frank Kline and W. H. Stout. |
| Jan. 9-10, | Ringgold, | Jefferson, | Frank Kline and W. H. Stout. |
| Jan. 12-13, | Baxter, | Jefferson, | Frank Kline and C. L. Goodling. |
| Jan. 14-15, | Russell, | Warren, | Frank Kline and C. L. Goodling. |
| Jan. 16-17, | Sugargrove, | Warren, | Frank Kline and C. L. Goodling. |
| Jan. 19-20, | Lottsville, | Warren, | Frank Kline and C. L. Goodling. |
| Jan. 21-22-23, | Emporium, | Cameron, | Frank Kline and C. L. Goodling. |
| Feb. 2-3, | Woles Church, | Erie, | Dr. M. E. Conard and W. R. White. |
| Feb. 4-5, | Millvillage, | Erie, | Dr. M. E. Conard and W. R. White. |
| Feb. 6-7, | Lundys Lane, | Erie, | Dr. M. E. Conard and W. R. White. |
| Feb. 9-10, | New Bethlehem, | Clarion, | Dr. M. E. Conard and J. F. Cox. |
| Feb. 11-12, | Sligo, | Clarion, | Dr. M. E. Conard and J. F. Cox. |
| Feb. 13-14, | Foxburg, | Clarion, | Dr. M. E. Conard and J. F. Cox. |
| Feb. 16-17, | Miola, | Clarion, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 18-19, | Marionville, | Forest, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 20-21, | Tionesta, | Forest, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 23, | Crosby, | McKean, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 24, | Farmers Valley, | McKean, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 25, | Eldred, | McKean, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 26, | Turtle Point, | McKean, | Dr. M. E. Conard and F. H. Fassett. |
| Feb. 27-28, | Pinerun, | Lycoming, | Dr. M. E. Conard, F. H, Fassett and Mrs. Jean Kane Foulke. |
| March 2-3, | Limestone, | Lycoming, | Mr. M. E. Conard, Prof. Frank D. Gardner and Jean Kane Foulke. |
| March 4-5, | Warrensville, | Lycoming, | Mr. M. E. Conard, Prof. Frank D. Gardner and Jean Kane Foulke. |
| March 6-7, | Hughesville, | Lycoming, | Mr. M. E. Conard, Prof. Frank D. Gardner and Jean Kane Foulke. |
| March 9-10, | Muncy Valley, | Sullivan, | Dr. M. E. Conard, Howard Mitman, H. M. Gooderham and Prof. F. R. Stevens. |
| March 11-12, | Colley, | Sullivan, | Dr. M. E. Conard, Howard Mitman, H. M. Gooderham and Prof. F. R. Stevens. |
| March 13-14, | Meshoppen, | Wyoming, | Dr. M. E. Conard, Howard Mitman, H. M. Gooderham and Prof. F. R. Stevens. |
| March 16-17, | Tunkhannock, | Wyoming, | Dr. M. E. Conard, Howard Mitman, H. M. Gooderham and Prof. F. R. Stevens. |

## FIFTH SECTION (Part One)

L. W. LIGHTY will attend all meetings in Part One of this section.

| Date. | | Place. | County. | Additional Lecturers. |
|---|---|---|---|---|
| Nov. | 28-29, | West Auburn, | Susquehanna, | Fred W. Card and J. Stuart Groupe. |
| Dec. | 1-2, | Rush. | Susquehanna, | Fred W. Card, J. Stuart Groupe and Prof. F. R. Stevens. |
| Dec. | 3-4, | South Montrose, | Susquehanna, | Fred W. Card, J. Stuart Groupe and Prof. F. R. Steven. |
| Dec. | 5-6, | Gibson, | Susquehanna, | Fred W. Card and J. Stuart Groupe. |
| Dec. | 8-9, | Honesdale, | Wayne, | Fred W. Card and J. Stuart Groupe. |
| Dec. | 10-11, | Waymart, | Wayne, | Fred W. Card and J. Stuart Groupe. |
| Dec. | 12-13, | Ariel, | Wayne, | Fred W. Card and J. Stuart Groupe. |
| Dec. | 15-16, | Sterling, | Wayne, | Fred W. Card, M. S. Bond and W. Theo. Wittman. |
| Dec. | 17-18, | Paupack, | Pike, | Fred W. Card, M. S. Bond and W. Theo. Wittman. |
| Dec. | 19-20, | Greentown, | Pike, | Fred W. Card, M. S. Bond and W. Theo. Wittman. |
| Dec. | 27, | Tompkinsville, | Lackawanna, | M. H. McCallum and Fred W. Card. |
| Dec. | 29-30, | Daleville, | Lackawanna, | M. H. McCallum and Fred W. Card. |
| Dec. 31, | Jan. 1, | Madisonville, | Lackawanna, | M. H. McCallum and Fred W. Card. |
| Jan. | 2, | Bald Mount, | Lackawanna, | M. H. McCallum and Fred W. Card. |
| Jan. | 3, | Clarks Summit, | Lackawanna, | M. H. McCallum and Fred W. Card. |
| Jan. | 5-6, | Dallas, | Luzerne, | M. H. McCallum, C. C. Hulsart and Prof. F. R. Stevens. |
| Jan. | 7-8, | Town Line, | Luzerne, | M. H. McCallum, C. C. Hulsart and Prof. F. R. Stevens. |
| Jan. | 9-10, | Conyngham, | Luzerne, | M. H. McCallum, C. C. Hulsart and Prof. F. R. Stevens. |
| Jan. | 12, | Weatherly, | Carbon, | M. H. McCallum, C. C. Hulsart, G. C. Given and Prof. F. R. Stevens. |
| Jan. | 13, | Big Creek, | Carbon, | M. H. McCallum, C. C. Hulsart, G. C. Given and Prof. F. R. Stevens. |
| Jan. | 14-15, | New Mahoning, | Carbon, | M. H. McCallum, F. H. Fassett and G. C. Given. |
| Jan. | 16-17, | Kunkletown, | Monroe, | W. Theo. Wittman, F. H. Fassett and G. C. Given. |
| Jan. | 19-20, | Canadensis, | Monroe, | W. Theo. Wittman, F. H. Fassett and W. H. Darst. |
| Jan. | 21-22, | Effort, | Monroe, | W. Theo. Wittman, F. H. Fassett and W. H. Darst. |
| Jan. | 23-24, | Egypt Mills, | Pike, | W. Theo. Wittman, F. H. Fassett and W. H. Darst. |
| Feb. | 2-3, | Bangor, | Northampton, | W. Theo. Wittman, F. H. Fassett and C. F. Noll. |

| Date. | Place. | County. | Additional Lecturers. |
|---|---|---|---|
| Feb. 4-5, | Nazareth, | Northampton, | W. Theo. Wittman, F. H. Fassett and C. F. Noll. |
| Feb. 6-7, | Cherryville, | Northampton, | W. Theo. Wittman, F. H. Fassett and C. F. Noll. |
| Feb. 9-10, | Macungie, | Lehigh, | Howard Mitman, F. H. Fassett and M. H. McCallum. |
| Feb. 11-12, | Laurys, | Lehigh, | Howard Mitman, F. H. Fassett and M. H. McCallum. |
| Feb. 13-14, | New Tripoli, | Lehigh, | Howard Mitman, F. H. Fassett and M. H. McCallum. |
| Feb. 16-17, | Friedensburg, | Schuylkill, | W. Theo. Wittman, Fred W Card and Prof. F. R. Stevens. |
| Feb. 18-19, | Valley View, | Schuylkill, | W. Theo. Wittman, Fred W Card and Prof. F. R. Stevens. |
| Feb. 20-21, | Barnsville, | Schuylkill, | W. Theo. Wittman, Fred W Card and Prof. F. R. Stevens. |
| Feb. 23-24, | Lewistown, | Schuylkill, | W. Theo. Wittman, Fred W Card and Prof. F. R. Stevens. |
| Feb. 25-26, | Springtown, | Bucks, | W. Theo Wittman and Dr. J. H. Funk. |
| Feb. 27-28, | Sellersville, | Bucks, | W. Theo Wittman and Dr. J. H. Funk. |
| March 2-3, | Doylestown, | Bucks, | W. Theo Wittman and Dr. J. H. Funk. |
| March 4-5, | Pineville, | Bucks, | W. Theo Wittman and Dr. J. H. Funk. |

## FIFTH SECTION (Part Two)

**FRED W. CARD will attend all meetings in this section.**

| | | | |
|---|---|---|---|
| Jan. 5, | Oxford, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 6, | Oxford, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 7, | Westgrove, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 8, | Westgrove, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 9, | Byers, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 10, | Byers, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 12, | Cedarville, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 13, | Cedarville, | Chester, | Paul I. Wrigley and Chas. A. Row. |
| Jan. 14, | Trappe, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 15, | Trappe, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 16, | Centre Point, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 17, | Centre Point, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 19, | Schwenkville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 20, | Schwenkville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 21, | Harleysville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 22, | Harleysville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 23, | East Greenville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |
| Jan. 24, | East Greenville, | Montgomery, | Chas. C. Hulsart and Dr. J. H. Funk. |

## MOVABLE INSTITUTE SCHOOLS

### DIRECTIONS TO COUNTY CHAIRMEN AND COMMITTEES OF ARRANGEMENTS

The following outline of Dairy, Horticultural and Poultry Topics form the basis of such instruction as will be taken up at the Movable Institute Schools. At a four-day meeting, two days will be devoted to Dairy Instruction and two days divided between Horticulture and Poultry interests. In preparing program, please select such topics as will be best suited for your locality, arranging for the speakers on such days as they are scheduled in Institute Bulletin. We recommend that at least one session relating to the Dairy Barn, Its Ventilation, etc., be held in a suitable Dairy Barn, also that one Horticultural session be held in a nearby Orchard, if the weather will permit. A lady speaker will be in attendance at one or more days at each school to give instruction on Household Economics, Home Sanitation and Domestic Science and should be placed on program for evening session.

### SCHOOL OF HORTICULTURI

### Session I

- Starting an Orchard:
    - Care and management
    - Pruning; how, when and what for
    - Spraying and marketing.
- Root System:
    - Structure of root
    - Functions
    - Absorption of food
    - Conduction
    - Effect of root pruning
    - Root injury.
- Trunk and branches:
    - Structure of stem
    - What is cambium
    - Function of stem
    - Buds
    - Relative to pruning.

### Session II

- How to feed a tree.
    - Fertilizers
    - Barnyard manure
    - Wood ashes

Lime
Commercial fertilizers
Mulches-sod mulches
Cultivation
Cover crops.

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## Session III

Varieties of fruits:
- Top working varieties
- Adaptation of varieties
- Importance of local varieties
- Change of latitude
- Self sterility of fruits
- Mixing varieties of orchards
- How to choose varieties
- Types of apples.

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## Session IV

### BUSINESS PROBLEMS OF THE ORCHARD

Subject—*Harvesting and Marketing Fruit.*
- When to pick and how
- Picking devices
- Effect of sun on picked fruit
- Effect of rain on picked fruit
- Effect of frost on picked fruit
- Packing and packages
- Packing houses and conveniences
- Storing and storing houses
- Shipping—associations
- Demands of the market
- Value of business methods
- Value of co-operation.

Practicum—To be announced.

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## Session V

Orchard Insects:
- Codling moth
- Apple tree borer
- Scale insects
- Canker worm
- Peach tree borer
- Curculois
- Rose Chafer.

### Session VI

Fungus Diseases:
- Apple scale
- Apple leaf spot
- Apple rust
- Apple twig blight
- Apple canker
- Crown gall
- Peach yellows
- Leaf curl
- Brown rot
- Pear tree blight
- Pear leaf blight.

Strawberries:

## SCHOOL OF DAIRYING

Subject—*The Dairy Barn.*
- Plan and arrangement
- Its convenience
- Tools and implements, where kept and what are needed.
- The cow stall
- Material of stall
- The dimensions
- The floor drop
- Manure gutter; how made.

Practicum—An hour will be devoted to the examination of the Dairy Barn.

Subject—*Light.*
- Windows, where located
- How constructed
- Effect upon the animal.

Subject—*Ventilation.*
- A suitable intake system
- The outlet for air
- Convenient arrangement of doors and chutes
- Ceiling construction.

Subject—*How to feed.*
- Extravagant feeding
- Long hay, fodder and ground grain
- Exposure to sun, storms and rains.

Subject—*Profitable feeding.*
- Short cut hay, fodder and ensilage
- Ground grain and products of mills
- Balance the feed to suit the cow
- How to balance a ration
- How to count profit and loss in feeding
- Best hay, fodder and silage
- How often should cows be fed.

Subject—*Care and management of the cow.*
How to keep a cow warm in winter
How to water and salt a cow
How to curry, bed and clean a cow.

Subject—*The dairy cow.*
Her breeding; the sire and dam
Conformation
The proper formed udder and teats.

Subject—*Raising the calf.*
What does it cost to raise a calf to be a cow
How fed
When fed
What shall constitute the feel.

Practice in testing milk products.

Testing of samples to show variations daily, time of milking first and last milk, daily, speed temperature, flushing.

Butter judging, acid test, fermentations.

Test three-day comp. samples from different herds. Cows to be in pairs same time in milk.

Lecture on cream ripening with cream to be set.

Churning and packing for market accompanying by explanation.

### EXERCISE I

BABCOCK TEST: The quality of milk and cream depends largely on the butter-fat in it.
To learn the amount of fat find the weight of milk and the per cent. of fat.
The Babcock Test merely tells what per cent. of the material is fat.

THE PRINCIPLE: The breaking up of the milk, or cream, etc., by sulphuric acid setting the fat free; separating it from the other constituents by means of centrifugal force, this being done in a bottle graduated to show the per cent. of fat.

VITAL: Features are a fair sample, an accurate measure of the amount used, complete separation, and accurate reading of the results, at proper temperature.

THE MILK: To be tested, fair sample, thoroughly mixed, pouring if practicable, sample measured with a pipette, 17-6 c. c. See that end is not broken. Milk should be ordinary room temperature.

**THE ACID**: Commercial sulphuric, strength, 1:82 sp. gr.; amount, 17.5 c. c.

Strong acid chars the fat—use less of it.

Weak acid shows white sediment in fat column, use more of it.

Slant bottle so ingoing acid runs down side of bottle. Mix with the milk at once.

Whirl five minutes, add hot water up to neck, whirl one minute, add water to 8 mark, whirl one minute, read. If using hand tester and room is cool, place bottle in bath at 120 for two or three minutes before reading.

Read from top of upper meniscus to bottom of lower.

Empty while warm, rinse, wash with alkali water, rinse.

**CREAM**: To test it the amount required should be weighed into the sample bottle, because the variation in its richness, the amount that will adhere to the pipette and the gas and air mixed in it by hauling or standing, make it impossible to measure the required amount accurately. The amount, 18 grains, or half this amount, in the latter case, with the ordinary cream bottle the reading would have to be doubled.

The amount of aid used with cream should be reduced a little, and after it is mixed with the cream should be allowed to stand a few minutes.

**SKIM MILK**: Tested the same as whole milk, except that a little more acid is required. The speed of the tester should be increased. A double neck skim milk bottle is required, especially for separator skim milk.

### EXERCISE II

The per cent. of fat in milk varies with different cows, with different breeds, with the same cow from day to day, from one milking to another, with change of feed, change of weather, fright abuse, noise that is unusual, if not accustomed to them, the presence of strangers at milking time may cause variation. The per cent. of fat in the milk is usually lower soon after the cow is fresh, than it is later in the period of lactation; with many cows the per cent. of increase slightly as the cow gets older. It is usually highest for the shortest period between milkings, and when these are equal for the one during which there has been most activity. The per cent. of fat is more influenced by nervous condition of the animal and individuality than by feed.

In separator cream, the per cent. of fat varies, because of variation of the per cent. of fat in the milk separated, temperature of milk at separating time, fullness of the supply can, speed of the separator, the amount of skim milk, or water, used in flushing the bowl.

In separator skim milk the increased per cent. of fat may be due, slow speed of separator, cold milk, irregular speed, machine not standing steady and firm.

### EXERCISE III

Scoring butter according to a score card, is but expressing in mathematical terms, the quality of butter. As yet no way has been devised for measuring the quality of butter, except to depend on the judgment of those skilled in the work. The score card:

| | |
|---|---|
| Flavor, | 45 |
| Body, | 25 |
| Color, | 15 |
| Salt, | 10 |
| Style, | 5 |
| Total, | 100 |

**FLAVOR:** Should be mild rich creamy, with a delicate mild pleasant aroma.

Some of the common faults of flavor; flat, lacking in the flavor due to proper development of the lactic acid, rancid due to over ripe cream, old cream, unclean, showing the effect of unclean milking, unclean utensils, surroundings, or methods. Weedy presence of flavors probably caused by undesirable feeds. Feverish, from milk from cows not in good health or too soon after freshening, or during sexual excitement. Smothered, due to closing the can of milk before properly cooling, or exposing closed can of milk to hot sun enroute to creamery. Fruity, or vegetables flavors, caused by presence of decaying vegetables or fruit. Dish rag, due to wiping utensils with the dish cloth, instead of thoroughly scalding with boiling water and allowing to dry.

**BODY:** Should be firm and wavy, not brittle, greasy, tallowy, spongy, sticky, or salvy.

**COLOR:** Should be uniform and even, free from streaks, mottles, curds.

**SALT:** Should be of desired amount, thoroughly dissolved, free from grit and evenly distributed.

**STYLE:** Package should be neat, clean, and tight.

### EXERCISE IV

This exercise to be devoted to testing samples of milk brought in by members of the class, and taken so as to show the difference in the variations in the composition of milk. To emphasize the value of knowing what each cow is producing in return for the feed she is consuming, to show how an approximate record may be kept with little real work.

Material required for keeping such records.

A spring balance, good one costs $4.00 though a much cheaper one will answer fairly well.

Sample jars, one for each cow, may be common fruit jars or milk jars, but should have covers.

A Babcock Tester that need not cost over $5.00.

The discovery of and removal from the herd of one or two cows that are eating more dollars worth of grain, hay and pasture than they are producing milk and butter fat to pay for will many times over pay for the labor and expense involved, especially when it is recalled that some cows produce $75.00 and $80.00 worth of butter fat for $35.00 or $40.00 worth of feed.

### EXERCISE V

Principles of Sanitary Milk Production.
Facts of Value to Dairymen about Bacteria in Milk.
Inside the Cows Udder. (Illustrated with charts.)

A milk sheet, which may be ruled up on common brown paper as follows:

| DATE. | Name of Cow. | Name of Cow. | Name of Cow. | Name of Cow. | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

### SCHOOL OF POULTRY HUSBANDRY

Subject—*Breeds.*
Short history of the various breeds. Origin, types and future advantages of pure bred flocks.
Principals of breeding, particularly along the line of increased egg production.
Effects of selection, cross-breeding, line breeding and inbreeding.

Subject—*Foods and Feeding.*
Purposes of feeding.
Comparative value of the various grains.
How best to feed and when.
Feeding for eggs, for growth, for fattening, etc.
Green food, animal food, shell and bone food, charcoal condiments.

Subject—*Houses and Yards.*
Colony, continuous house and free range plans.
Situations, soils and exposures.
Advantages of low cost, construction and simplicity.
Wide open and curtain front, fresh air houses.

Subject—*Easy and Simple Methods of Poultry Keeping.*
Why such methods are best.
Where most people fall down.
Advantages of poultry keeping; vast importance and extent of same.

Subject—*Incubation.*

The advantages and disadvantages of natural and artificial incubation compared.
Necessary adjuncts of good hatches.

Subject—*Brooding and Rearing.*

Natural methods of brooding.
Cold brooders; artificially heated brooders.
The first feed for chicks.
Extreme importance and desirability of uninterrupted or unchecked growth.

Subject—*Winter Egg Production.*

Factors making the same.
Selecting and handling the layers.
Housing and feeding.
Marketing the eggs.

Note—Besides the list of the various Poultry Journals and the bulletins on Poultry Keeping issued by the National and various State Departments of Agriculture, those interested in Poultry Keeping should secure and study Poultry Craft, by Robinson; Progressive Poultry Culture, by Bingham; The New Book on Poultry, by Wright; Poultry Culture, by Felch; and A Living from Poultry, by Boyer.

## MOVABLE INSTITUTE SCHOOLS

### SEASON 1913-1814

| Date | Place | County | Additional Lecturers |
|---|---|---|---|
| Dec. 1, | Jonestown, | Lebanon, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 2, | Jonestown, | Lebanon, | W. Theo. Wittman and F. H Fassett. |
| Dec. 3, | Jonestown, | Lebanon, | Dr. M. E. Conard, R. J. Weld and Dr. Louis A. Klein. |
| Dec. 4, | Jonestown, | Lebanon, | Dr. M. E. Conard, R. J. Weld and Dr. Louis A. Klein. |
| Dec. 3, | Centerville, | Cumberland, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 4, | Centerville, | Cumberland, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 5, | Centerville, | Cumberland, | Dr. M. E. Conard, R. J. Weld and Dr. Louis A. Klein. |
| Dec. 6, | Centerville, | Cumberland, | Dr. M. E. Conard, R. J. Weld and Dr. Louis A. Klein. |
| Dec. 5, | Needmore, | Fulton, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 6. | Needmore, | Fulton, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 8, | Needmore, | Fulton, | Dr. M. E. Conard and R. J. Weld. |
| Dec. 9, | Needmore, | Fulton, | Dr. M. E. Conard and R. J. Weld |
| Dec. 29, | Franklin, | Venango, | W. Theo. Wittman and F. H. Fassett. |
| Dec. 30, | Franklin, | Venango, | W. Theo. Wittman, F. H. Fassett and R. S. Seeds. |
| Dec. 31, | Franklin, | Venango, | Dr. M. E. Conard, R. J. Weld and R. S. Seeds. |
| Jan. 1, | Franklin, | Venango, | Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK Lyons. |

| Date | | Place | County | Additional Lecturers |
|---|---|---|---|---|
| Dec. | 31, | Westfield, | Lawrence, | W. Theo. Wittman and F. H. Fassett. |
| Jan. | 1, | Westfield, | Lawrence, | W. Theo. Wittman, F. H. Fassett, and R. S. Seeds. |
| Jan. | 2, | Westfield, | Lawrence, | Dr. M. E. Conard, R. J. Weld, R. S. Seeds and Dr. Hanah McK Lyons. |
| Jan. | 3, | Westfield, | Lawrence, | Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK Lyons. |
| Jan. | 5, | Butler, | Butler, | W. Theo. Wittman and F. H. Fassett. |
| Jan. | 6, | Butler, | Butler, | W. Theo. Wittman, F. H. Fassett and R. S. Seeds. |
| Jan. | 7, | Butler, | Butler, | Dr. M. E. Conard, R. J. Weld and R. S Seeds. |
| Jan. | 8, | Butler, | Butler, | Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons. |
| Jan. | 7, | Geistown, | Cambria, | W. Theo. Wittman and F. H. Fassett. |
| Jan. | 8, | Geistown, | Cambria, | W. Theo. Wittman, F. H. Fassett and Robt. S. Seeds. |
| Jan. | 9, | Geistown, | Cambria, | Dr. M. E. Conard, R. J. Weld, R. S. Seeds and Dr. Hannah McK. Lyons. |
| Jan. | 10, | Geistown, | Cambria, | Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons. |
| Jan. | 12, | Bloomsburg, | Columbia, | W. Theo. Wittman, F. H. Fassett and Dr. Hannah McK. Lyons. |
| Jan. | 13, | Bloomsburg, | Columbia, | W. Theo. Wittman, F. H Fassett, Robt. S Seeds and Dr. Hannah McK. Lyons. |
| Jan. | 14, | Bloomsburg, | Columbia, | Dr. M. E. Conard, R. J. Weld and Robt. S. Seeds. |
| Jan. | 15, | Bloomsburg, | Columbia, | Dr. M. E. Conard, R. J. Weld and Dr. A Holmes. |
| Jan. | 16, | Bloomsburg, | Columbia, | Dr. M. E. Conard and R. J. Weld. |

# LIST OF SPEAKERS AND THEIR ASSIGNMENTS

FOR SEASON OF 1913-1914

### H. M. ANDERSON, New Park, York County, Pa.

| | Date. | Place. | County. |
|---|---|---|---|
| Jan. | 7, | Newburg, | Cumberland. |
| Jan. | 8-9, | Oakville, | Cumberland. |
| Jan. | 10, | Hogestown, | Cumberland. |
| Jan. | 12-13, | New Cumberland, | Cumberland. |
| Jan. | 14-15, | Womelsdorf, | Berks. |
| Jan. | 16-17, | Centerport, | Berks. |
| Jan. | 19-20, | Geigertown, | Berks. |
| Jan. | 21-22, | Jacksonwald, | Berks. |
| Jan. | 23-24, | Bustleton, | Philadelphia. |

### C. M. BARNITZ, Riverside, Northumberland County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 30-31, | Lewisburg, | York. |
| Feb. | 2-3, | Loganville, | York. |
| Feb. | 4-5, | Fawn Grove, | York. |
| Feb. | 6-7, | Red Lion, | York. |
| Feb. | 9-10, | Dover, | York. |
| Feb. | 11-12, | Wellsville, | York. |
| Feb. | 13-14, | York Springs, | Adams. |
| Feb. | 16-17, | Arendtsville, | Adams. |
| Feb. | 18-19, | Fairfield, | Adams. |
| Feb. | 20-21, | Scotland, | Franklin. |
| Feb. | 23-24, | Marion, | Franklin. |
| Feb. | 25-26, | Waynesboro, | Franklin. |
| Feb. | 27-28, | Dry Run, | Franklin. |
| March | 2-3, | Media, | Delaware. |
| March | 4-5, | Concordville, | Delaware. |

### R. H. BELL, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Dec. | 29-30, | Pine Grove Mills, | Centre. |
| Dec. | 31, Jan. 1, | Rebersburg, | Centre. |
| Jan. | 2-3, | Jacksonville, | Centre. |

### M. S. BOND, Danville, Montour County, Pa.

| | | | |
|---|---|---|---|
| Dec. | 15-16, | Sterling, | Wayne. |
| Dec. | 17-18, | Paupack, | Pike. |
| Dec. | 19-20, | Greentown, | Pike. |

### J. T. CAMPBELL, Hartstown, Crawford County, Pa.

**Will attend all meetings in the Third Section.**

### Dr. M. E. CONARD, Westgrove, Chester County, Pa.

Will attend Movable Institute Schools Dec. 3 to Jan. 16, and Farmers' Institutes in Fourth Section from February 2 to March 17.

### FRED W. CARD, Sylvania, Bradford County, Pa.

Will attend all meetings in the Fifth Section (part one), from Nov. 28 to Jan. 3 and from Feb. 16 to Feb. 24; Fifth Section (part two) from Jan. 5 to Jan. 24.

### J. F. COX, State College, Centre County, Pa.

| | Date. | County. | Place. |
|---|---|---|---|
| Feb. | 9-10, | New Bethlehem, | Clarion. |
| Feb. | 11-12, | Sligo, | Clarion. |
| Feb. | 13-14, | Foxburg, | Clarion. |

### CHAS. T. CORNMAN, Carlisle, Cumberland County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 23-24, | Bustleton, | Philadelphia. |
| Feb. | 23-24, | Pottsgrove, | Northumberland. |
| Feb. | 25-26, | McEwensville, | Northumberland. |
| Feb. | 27-28, | Exchange, | Montour. |
| March | 2-3, | Grovania, | Montour. |
| March | 4-5, | McAllisterville, | Juniata. |
| March | 6-7, | Port Royal, | Juniata. |

### W. H. DARST, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 19-20, | Canadensis, | Monroe. |
| Jan. | 21-22, | Effort, | Monroe. |
| Jan. | 23-24, | Egypt Mills, | Pike. |

### H. P. DAVIS, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 28-29, | Pine Bank, | Greene. |
| Dec. | 1-2, | Sycamore, | Greene. |
| Dec. | 3-4, | Claysville, | Washington. |
| Dec. | 5-6, | Washington, | Washington. |

### E. B. DORSETT, Mansfield, Tioga County, Pa.

Will attend all meetings in the Third Section from December 15 to Dec. 23; Second Section Jan. 12 to Jan. 24 and the First Section from Jan. 30 to March 5.

### F. H. FASSETT, Meshoppen, Wyoming County, Pa.

Will attend Movable Institute Schools Dec. 1 to Jan. 13; Farmers' Institutes in the Second Section Dec. 8 to Dec. 11 and March 2 to March 7; Fifth Section (part one) Jan. 14 to Feb. 14 and the Fourth Section from Feb. 16 to Feb. 28.

MRS. JEAN KANE FOULKE, West Chester, Chester County, Pa.

| | Date. | Place. | County. |
|---|---|---|---|
| Nov. | 25-26, | Athens, | Bradford. |
| Nov. | 28-29, | Rome, | Bradford. |
| Dec. | 1-2, | Canton, | Bradford. |
| Dec. | 3-4, | Troy, | Bradford. |
| Dec. | 5-6, | Liberty, | Tioga. |
| Dec. | 8-9, | Mansfield, | Tioga. |
| Dec. | 10-11, | Mitchells Mills, | Tioga. |
| Dec. | 12, | Tioga, | Tioga. |
| Dec. | 13, | Wellsboro, | Tioga. |
| Dec. | 15-16, | Westfield, | Tioga. |
| Dec. | 17-18, | Ulysses, | Potter. |
| Dec. | 19-20, | Gold, | Potter. |
| Dec. | 22-23, | Sweden Valley, | Potter. |
| Dec. | 29-30, | Woolrich, | Clinton. |
| Dec 31, | Jan. 1, | Logantown, | Clinton. |
| Jan. | 2-3, | Beech Creek, | Clinton. |
| Feb. | 27-28, | Pinerun, | Lycoming. |
| March | 2-3, | Lime Stone, | Lycoming. |
| March | 4-5, | Warrensville, | Lycoming. |
| March | 6-7, | Hughesville, | Lycoming. |

Dr. J. H. FUNK, Boyertown, Berks County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 14-15, | Trappe, | Montgomery. |
| Jan. | 16-17, | Centre Point, | Montgomery. |
| Jan. | 19-20, | Schwenkville, | Montgomery. |
| Jan. | 21-22, | Harleysville, | Montgomery. |
| Jan. | 23-24, | East Greenville, | Montgomery. |
| Feb. | 25-26, | Springtown, | Bucks. |
| Feb. | 27-28, | Sellersville, | Bucks. |
| March | 2-3, | Doylestown, | Bucks. |
| March | 4-5, | Pineville, | Bucks. |

SHELDON W. FUNK, Boyertown, Berks County, Pa.

Will attend all meetings in the Third Section from Nov. 28 to Dec. 23; Second Section from Feb. 2 to Feb. 28; First Section Dec. 29 to Jan. 22.

PROF. FRANK D. GARDNER, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| March | 2-3, | Limestone, | Lycoming. |
| March | 4-5, | Warrensville, | Lycoming. |
| March | 6-7, | Hughesville, | Lycoming. |

G. C. GIVEN, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 12, | Weatherly, | Carbon. |
| Jan. | 13, | Big Creek, | Carbon. |
| Jan. | 14-15, | New Mahoning, | Carbon. |
| Jan. | 16-17, | Kunkletown, | Monroe. |

### H. M. GOODERHAM, Patton, Cambria County, Pa.

| | Date. | Place. | County. |
|---|---|---|---|
| Dec. | 12-13, | Pleasant Valley, | Bedford. |
| Dec. | 15-16, | New Paris, | Bedford. |
| Dec. | 17-18, | Osterburg, | Bedford. |
| Dec. | 29-30, | Pine Grove Mills, | Centre. |
| Dec. | 31, Jan. 1, | Rebersburg, | Centre. |
| Jan. | 2-3, | Jacksonville, | Centre. |
| Jan. | 5-6, | Kerrmoor, | Clearfield. |
| Jan. | 7-8, | Goshen, | Clearfield. |
| Jan. | 9-10, | Karthaus, | Clearfield. |
| March | 9-10, | Muncy Valley, | Sullivan. |
| March | 11-12, | Colley, | Sullivan. |
| March | 13-14, | Meshoppen, | Wyoming. |
| March | 16-17, | Tunkhannock, | Wyoming. |

### C. L. GOODLING, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 12-13, | Baxter, | Jefferson. |
| Jan. | 14-15, | Russell, | Warren. |
| Jan. | 16-17, | Sugargrove, | Warren. |
| Jan. | 19-20, | Lottsville, | Warren. |
| Jan. | 21-22-23, | Emporium, | Cameron. |

### J. STUART GROUPE, Jersey Shore, R. D. No. 4, Lycoming County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 28-29, | West Auburn, | Susquehanna. |
| Dec. | 1-2, | Rush, | Susquehanna. |
| Dec. | 3-4, | South Montrose, | Susquehanna. |
| Dec. | 5-6, | Gibson, | Susquehanna. |
| Dec. | 8-9, | Honesdale, | Wayne. |
| Dec. | 10-11, | Waymart, | Wayne. |
| Dec. | 12-13, | Ariel, | Wayne. |
| Jan. | 5-6, | Kerrmoor, | Clearfield. |
| Jan. | 7-8, | Goshen, | Clearfield. |
| Jan. | 9-10, | Karthaus, | Clearfield. |
| Jan. | 12-13, | Bellwood, | Blair. |
| Jan. | 14-15, | Geeseytown, | Blair. |
| Jan. | 16-17, | East Freedom, | Blair. |

### H. H. HAVNER, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Feb. | 9-10, | Atlantic, | Crawford. |
| Feb. | 11-12, | Transfer, | Mercer. |
| Feb. | 13-14, | Jackson Center, | Mercer. |

### E. K. HIBSHMAN, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Dec. | 5-6, | Maytown, | Lancaster. |
| Dec. | 8-9, | Mechanicsville, | Lancaster. |
| Dec. | 10-11, | Lititz, | Lancaster. |
| Dec. | 12-13, | Ephrata, | Lancaster. |
| Dec. | 15-16, | Lampeter, | Lancaster. |
| Dec. | 17-18, | Paradise, | Lancaster. |
| Dec. | 19, | Millersville, | Lancaster. |
| Dec. | 20, | Blue Ball, | Lancaster. |

## CHAS C. HULSART, Matawan, N. J.

| | Date. | Place. | County. |
|---|---|---|---|
| Nov. | 28-29, | Middletown, | Dauphin. |
| Dec. | 1-2, | Gratz, | Dauphin. |
| Dec. | 3-4, | Linglestown, | Dauphin. |
| Dec. | 5-6, | Maytown, | Lancaster. |
| Dec. | 8-9, | Mechanicsville, | Lancaster. |
| Dec. | 10-11, | Lititz, | Lancaster. |
| Dec. | 12-13, | Ephrata, | Lancaster. |
| Dec. | 15-16, | Lampeter, | Lancaster. |
| Dec. | 17-18, | Paradise, | Lancaster. |
| Dec. | 19, | Millersville, | Lancaster. |
| Dec. | 20, | Blue Ball, | Lancaster. |
| Jan. | 5-6, | Dallas, | Luzerne. |
| Jan. | 7-8, | Town Line, | Luzerne. |
| Jan. | 9-10, | Conyngham, | Luzerne. |
| Jan. | 12, | Weatherly, | Carbon. |
| Jan. | 13, | Big Creek, | Carbon. |
| Jan. | 14-15, | Trappe, | Montgomery. |
| Jan. | 16-17, | Centre Point, | Montgomery. |
| Jan. | 19 20, | Schwenkville, | Montgomery. |
| Jan. | 21-22, | Harleysville, | Montgomery. |
| Jan. | 23-24, | East Greenville, | Montgomery. |

## R. P. KESTER, Grampian, Clearfield County, Pa.

Will attend all meetings in the Fourth Section.

## J. B. JOHNSTON, New Wilmington, Lawrence County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 28-29, | Houstontown, | Fulton. |
| Dec. | 1-2, | Enid, | Fulton. |
| Dec. | 3-4, | Orbisonia, | Huntingdon. |
| Dec. | 5-6, | McAlevys Fort, | Huntingdon. |

## FRANK KLINE, Spring City, Chester County, Pa.

| | | | |
|---|---|---|---|
| Dec. | 5-6, | Maytown, | Lancaster. |
| Dec. | 8-9, | Mechanicsville, | Lancaster. |
| Dec. | 10-11, | Lititz, | Lancaster. |
| Dec. | 12-13, | Ephrata, | Lancaster. |
| Dec. | 15-16, | Lampeter, | Lancaster. |
| Dec. | 17-18, | Paradise, | Lancaster. |
| Dec. | 19, | Millersville, | Lancaster. |
| Dec. | 20, | Blue Ball, | Lancaster. |
| Dec. | 29-30, | Woolrich, | Clinton. |
| Dec. | 31, Jan. 1, | Logantown, | Clinton. |
| Jan. | 2-3, | Beech Creek, | Clinton. |
| Jan. | 5-6, | St. Marys, | Elk. |
| Jan. | 7-8, | Kersey, | Elk. |
| Jan. | 9-10, | Ringgold, | Jefferson. |
| Jan. | 12-13, | Baxter, | Jefferson. |
| Jan. | 14-15, | Russell, | Warren. |
| Jan. | 16-17, | Sugargrove, | Warren. |
| Jan. | 19-20, | Lottsville, | Warren. |
| Jan. | 21-22-23, | Emporium, | Cameron. |

**Dr. LOUIS A. KLEIN, No. 36th and Woodland Avenues, Philadelphia, Pa.**

| Date. | | Place. | County. |
|---|---|---|---|
| Dec. | 3-4, | Jonestown, | Lebanon. |
| Dec. | 5-6, | Centerville, | Cumberland. |

**H. R. KRAYBILL, State College, Centre County, Pa.**

| | | | |
|---|---|---|---|
| Jan. | 30-31, | Lewisberry, | York. |
| Feb. | 2-3, | Loganville, | York. |
| Feb. | 4-5, | Fawn Grove, | York. |
| Feb. | 6-7, | Red Lion, | York. |
| Feb. | 9-10, | Dover, | York. |

**L. W. LIGHTY, East Berlin, Adams County, Pa.**

Will attend all meetings in the Fifth Section (part one).

**M. H. McCALLUM, Wernersville, Berks County, Pa.**

Will attend all meetings in the Third Section from Nov. 28 to Dec. 13 and Feb. 18 to March 10; Fifth Section Dec. 27 to Jan. 15 and from Feb. 9 to Feb. 14.

**Dr. HANNAH McK. LYONS, Lincoln University, Chester County, Pa.**

| | | | |
|---|---|---|---|
| Jan. | 1, | Franklin, | Venango. |
| Jan. | 2, | Westfield. | Lawrence. |
| Jan. | 3, | Westfield. | Lawrence. |
| Jan. | 6, | Brushvalley, | Indiana. |
| Jan. | 7, | Lewisville, | Indiana. |
| Jan. | 8, | Butler, | Butler. |
| Jan. | 9-10, | Geistown, | Cambria. |
| Jan. | 12-13, | Bloomsburg, | Columbia. |
| Feb. | 24, | Pottsgrove, | Northumberland. |
| Feb. | 25, | McEwensville, | Northumberland. |

**PROF. FRANKLIN MENGES, York, York County, Pa.**

Will attend all meetings in the Second Section.

**HOWARD MITMAN, Hellertown, Northampton County, Pa.**

| | | | |
|---|---|---|---|
| Dec. | 29-30, | Landisburg, | Perry. |
| Dec. | 31, Jan. 1, | Ickesburg, | Perry. |
| Jan. | 2-3, | Annville, | Lebanon. |
| Jan. | 5-6, | Schaefferstown, | Lebanon. |
| Feb. | 9-10, | Macungie, | Lehigh. |
| Feb. | 11-12, | Laurys, | Lehigh. |
| Feb. | 13-14, | New Tripoli, | Lehigh. |
| March | 9-10, | Muncy Valley, | Sullivan. |
| March | 11-12, | Colley, | Sullivan. |
| March | 13-14, | Meshoppen, | Wyoming. |
| March | 16-17, | Tunkhannock, | Wyoming. |

### C. F. NOLL, State College, Centre County, Pa.

| | Date. | Place. | County. |
|---|---|---|---|
| Feb. | 2-3, | Bangor, | Northampton. |
| Feb. | 4-5, | Nazareth, | Northampton. |
| Feb. | 6-7, | Cherryvile, | Northampton. |

### W. M. PATTON, Mosgrove, R. D. No. 2, Armstrong County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 28-29, | Houstontown, | Fulton. |
| Dec. | 1-2, | Enid, | Fulton. |
| Dec. | 3-4, | Orbisonia, | Huntingdon. |
| Dec. | 5-6, | McAlevys Fort, | Huntingdon. |
| Dec. | 8-9, | Warriors Mark, | Huntingdon. |
| Dec. | 10-11, | Markelsburg, | Huntingdon. |
| Dec. | 12-13, | Pleasant Valley, | Bedford. |
| Dec. | 15-16, | New Paris, | Bedford. |
| Dec. | 17-18, | Osterburg, | Bedford. |
| Feb. | 23-24, | Plaingrove, | Lawrence. |
| Feb. | 25-26, | Slippery Rock, | Butler. |
| Feb. | 27-28, | Prospect, | Butler. |
| March | 2-3, | Jefferson Grange Hall, | Butler. |
| March | 4-5, | Dayton, | Armstrong. |
| March | 6-7, | Elderton, | Armstrong. |
| March | 9-10, | Spring Church, | Armstrong. |

### J. H. PEACHEY, Belleville, Mifflin County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 28-29, | Middletown, | Dauphin. |
| Dec. | 1-2, | Gratz, | Dauphin. |
| Dec. | 3-4, | Linglestown, | Dauphin. |
| Dec. | 5-6, | Maytown, | Lancaster. |
| Dec. | 29-30, | Smicksburg, | Indiana. |
| Dec 31, | Jan. 1, | Marion Center, | Indiana. |
| Jan. | 2-3, | Willet, | Indiana. |
| Jan. | 5-6, | Brushvalley, | Indiana. |
| Jan. | 7-8, | Lewisville, | Indiana. |
| Jan. | 9-10, | Latrobe, | Westmoreland. |
| Jan. | 12-13, | Greensburg, | Westmoreland. |
| Jan. | 14-15, | Scottdale, | Westmoreland. |
| Jan. | 16-17, | Irwin, | Westmoreland. |
| Feb. | 2-3, | Mosiertown, | Crawford. |
| Feb. | 4-5, | Blooming Valley, | Crawford. |
| Feb. | 6-7, | Conneaut Lake, | Crawford. |

E. L. PHILLIPS, New Bethlehem, R. D. No. 2, Clarion County, Pa.

| | Date. | Place. | County. |
|---|---|---|---|
| Dec. | 8-9, | Mansfield, | Tioga. |
| Dec. | 10-11, | Mitchells Mills, | Tioga. |
| Dec. | 12, | Tioga, | Tioga. |
| Dec. | 13, | Wellsboro, | Tioga. |
| Dec. | 15-16, | Westfield, | Tioga. |
| D.ce | 17-18, | Ulysses, | Potter. |
| Dec. | 19-20, | Gold, | Potter. |
| Dec. | 22-23, | Sweden Valley, | Potter. |
| Feb. | 2-3, | Patton, | Cambria. |
| Feb. | 4-5, | Ebensburg, | Cambria. |
| Feb. | 6-7, | McVeytown, | Mifflin. |
| Feb. | 9-10, | Milroy, | Mifflin. |
| Feb. | 11-12, | Beavertown, | Snyder. |
| Feb. | 13-14, | Freeburg, | Snyder. |
| Feb. | 16-17, | Mifflinburg, | Union. |
| Feb. | 18-19, | Winfield, | Union. |
| Feb. | 20-21, | Rebuck, | Northumberland. |

FRED S. PUTNEY, State College, Centre County, Pa.

| | | | |
|---|---|---|---|
| Jan. | 19-20, | Millerton, | Allegheny. |
| Jan. | 21-22, | East Union, | Allegheny. |
| Jan. | 23-24, | Carnot, | Allegheny. |

CHAS. A. ROW, Yardley, Bucks County, Pa.

| | | | |
|---|---|---|---|
| Nov. | 25-26, | Athens, | Bradford. |
| Nov. | 28-29, | Rome, | Bradford. |
| Dec. | 1-2, | Canton, | Bradford. |
| Dec. | 3-4, | Troy, | Bradford. |
| Dec. | 5-6, | Liberty, | Tioga. |
| Dec. | 8-9, | Mansfield, | Tioga. |
| Dec. | 10-11, | Mitchells Mills, | Tioga. |
| Dec. | 12, | Tioga, | Tioga. |
| Dec. | 13, | Wellsboro, | Tioga. |
| Jan. | 5-6, | Oxford, | Chester. |
| Jan. | 7-8, | Westgrove, | Chester. |
| Jan. | 9-10, | Byers, | Chester. |
| Jan. | 12-13, | Cedarville, | Chester. |

ROBT. S. SEEDS, Birmingham, Huntingdon County, Pa.

| | | | |
|---|---|---|---|
| Dec. | 30-31, | Franklin, | Venango. |
| Jan. | 1-2, | Westfield, | Lawrence. |
| Jan. | 3, | Willet, | Indiana. |
| Jan. | 5, | Brushvalley, | Indiana. |
| Jan. | 6-7, | Butler, | Butler. |
| Jan. | 8-9, | Geistown, | Cambria. |
| Jan. | 13-14, | Bloomsburg, | Columbia. |
| Jan. | 19-20, | Boswell, | Somerset. |
| Jan. | 21-22, | Somerset, | Somerset. |
| Jan. | 23-24, | Salisbury, | Somerset. |

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| Date. | Place. | County. |
|---|---|---|
| | **B. O. SEVERSON, State College, Centre County, Pa.** | |
| Dec. 15-16, | Lampeter, | Lancaster. |
| Dec. 17-18, | Paradise, | Lancaster. |
| Dec. 19, | Millersville, | Lancaster. |
| Dec. 20, | Blue Ball, | Lancaster. |
| | **PROF. F. R. STEVENS, Agriculturist.** | |
| Nov. 25-26, | Athens, | Bradford. |
| Nov. 28-29, | Rome, | Bradford. |
| Dec. 1-2, | Rush, | Susquehanna. |
| Dec. 3-4, | South Montrose, | Susquehanna. |
| Jan. 5-6, | Dallas, | Luzerne. |
| Jan. 7-8, | Town Line, | Luzerne. |
| Jan. 9-10, | Conyngham, | Luzerne. |
| Jan. 12, | Weatherly, | Carbon. |
| Jan. 13, | Big Creek, | Carbon. |
| Feb. 16-17, | Friedensburg, | Schuylkill. |
| Feb. 18-19, | Valley View, | Schuylkill. |
| Feb. 20-21, | Barnsville, | Schuylkill. |
| Feb. 23-24, | Lewistown, | Schuylkill. |
| March 9-10, | Muncy Valley, | Sullivan. |
| March 11-12, | Colley, | Sullivan. |
| March 13-14, | Meshoppen, | Wyoming. |
| March 16-17, | Tunkhannock, | Wyoming. |
| | **W. H. STOUT, Pinegrove, Schuylkill County, Pa.** | |
| Jan. 5-6, | St. Marys, | Elk. |
| Jan. 7-8, | Kersey, | Elk. |
| Jan. 9-10, | Ringgold, | Jefferson. |
| | **W. H. TOMHAVE, State College, Centre County, Pa.** | |
| Dec. 8-9, | Mechanicsville, | Lancaster. |
| Dec. 10-11, | Lititz, | Lancaster. |
| Dec. 12-13, | Ephrata, | Lancaster. |
| Feb. 16-17, | Mercer, | Mercer. |

**LEON OTICE VAN NOY, Troy, R. D. No. 66, Bradford County, Pa.**

Will attend all meetings in the Third Section from Dec. 29 to Feb. 7 and Feb. 23 to March 10; Section Section Feb. 11 to Feb. 19.

**DAVID E. WARNER, State College, Centre County, Pa.**

| | | |
|---|---|---|
| Dec. 1-2, | Canton, | Bradford. |
| Dec. 3-4, | Troy, | Bradford. |
| Dec. 5-6, | Liberty, | Tioga. |

**D. H. WATTS, Kerrmoor, Clearfield County, Pa.**

Will attend all meetings in the First Section.

### R. J. WELD, Sugargrove, Warren County, Pa.

| Date. | Place. | County. |
|---|---|---|
| Dec. 3-4, | Jonestown, | Lebanon. |
| Dec. 5-6, | Centerville, | Cumberland. |
| Dec. 8-9, | Needmore, | Fulton. |
| Dec. 15-16, | Westfield, | Tioga. |
| Dec. 17-18, | Ulysses, | Potter. |
| Dec. 19-20, | Gold, | Potter. |
| Dec. 22-23, | Sweden Valley, | Potter. |
| Dec. 31, Jan. 1, | Franklin, | Venango. |
| Jan. 2-3, | Westfield, | Lawrence. |
| Jan. 7-8, | Butler, | Butler. |
| Jan. 9-10, | Geistown, | Cambria. |
| Jan. 14-15-16, | Bloomsburg, | Columbia. |

### W. R. WHITE, State College, Centre County, Pa.

| | | |
|---|---|---|
| Feb. 2-3, | Woles Church, | Erie. |
| Feb. 4-5, | Millvillage, | Erie. |
| Feb. 6-7, | Lundys Lane, | Erie. |

### W. THEO WITTMAN, Mt. Gretna, Lebanon County, Pa.

Will attend Movable Institute Schools Dec. 1 to Jan. 13; Farmers' Institutes in the Fourth Section Nov. 25 to Nov. 29; Fifth Section Dec. 15 to Dec. 20, Jan. 16 to Feb. 7 and Feb. 16 to March 5.

### E. L. WORTHEN, State College, Centre County, Pa.

| | | |
|---|---|---|
| Dec. 8-9, | Hickory, | Washington. |
| Dec. 10-11, | Dunbar, | Fayette. |
| Dec. 12-13, | Smock. | Fayette. |

### PAUL I. WRIGLEY, Eddington, Bucks County, Pa.

| | | |
|---|---|---|
| Jan. 5-6, | Oxford, | Chester. |
| Jan. 7-8, | Westgrove, | Chester. |
| Jan. 9-10, | Byers, | Chester. |
| Jan. 12-13, | Cedarville, | Chester. |

### W. D. ZINN, Phillippi, W. Va.

| | | |
|---|---|---|
| Feb. 9-10, | Atlantic, | Crawford. |
| Feb. 11-12, | Transfer, | Mercer. |
| Feb. 13-14. | Jackson Center, | Mercer. |
| Feb. 16-17, | Mercer, | Mercer. |
| Feb. 18-19, | Bethel Church, | Lawrence. |
| Feb. 20-21, | Herman Church, | Lawrence. |

## GENERAL LIST OF INSTITUTE LECTURERS WITH THEIR ASSIGNMENTS

1913-1914

ANDERSON, H. M., New Park, Pa.:

1. Corn Culture.
2. Alfalfa and other Legumes.
3. Control of Soil Moisture.
4. Home Mixed Fertilizers.
5. Potato Culture.
6. Orchard Management. (30-40 minutes each).

BARNITZ, C. M., Riverside, Pa.:

1. Mother Hen; Her Brood and Their Care.
2. The Chick from Shell to Maturity. (Illustrated with lantern slides).
3. Turkey Raising; How to Succeed. (Illustrated with lantern slides).
4. Common Diseases of Poultry; Their Prevention and Cure.
5. Poultry Parasites; Their Description and Destruction.
6. Artificial Incubation and Brooding.
7. Best Farm Breeds and Their Needs.
8. Feeding for Winter Eggs.
9. The Modern Poultry House; Its Location, Construction and Furniture.
10. The Farm Boy's Welfare. (Evening).
11. The Evolution of the Rooster. (Evenings.) (30-40 minutes each).

Note: When slides are to be used with Nos. 2, 3, and 4 Chairmen must notify.

BECHTEL, A. R., State College, Pa.:

1. Weeds; Nature, Dispersal, Injuries and Treatment.
2. The Farmer and Pure Seed. (60 minutes each).

BELL, R. H., State College, Pa.:

1. Controlling Insects and Diseases of the Peach.
2. Controlling Insects and Diseases of the Apple.
3. The Home Orchard.
4. Spraying Materials; Their Preparation and Use. (25-30 minutes each).

BENNINGER, W. M., Walnutport, Pa.:

1. Specialties on the Farm.
2. Profit in Breeding Pure Bred Dairy Cattle.
3. Proper Selection and Care of a Dairy Herd.

4. Poultry on the Farm.
5. Reasons of the High Cost of Living.
6. Butter Making on the Farm.
7. How to Make Good Roads in a Business Way.

BOND, M. S., Danville, Pa.:

1. Thirty-five Years' Experience with Commercial Fertilizers.
2. Potato Culture.
3. Some of the Problems as to Use of Lime.
4. Intensive Agriculture.
5. Why do the Boys and Girls leave the Farm?
6. Results of Farmers' Organizations. (20-30 minutes each).

CAMPBELL, J. T., Hartstown, Pa.:

1. Poultry (a) Houses and Fixtures. (30 minutes).
   (b) Breeds and Breeding. (40 minutes).
   (c) Foods and Feeding. (45 minutes).
   (d) Lice, Gapes and Diseases. (30 minutes).
   (f) Incubators and Brooders. (30 minutes).
2. Poultry Farming as a Business Specialty. (40 minutes).
3. Problems of the Large Poultry Farm. (40 minutes).
4. The Work of the Farmers' Institutes. (20 minutes).
5. How Nature Makes Soil. (Illustrated with Lantern Slides.) (45 minutes).
6. Basic Principals of Soil Improvement. (40 minutes).
7. Economic Maintenance of Productive Power of Soil. (40 minutes).
8. Values of Commercial Feeding Stuffs. (30 minutes).
9. Country Home Improvement. (40 minutes).
10. The Farm of Life. (Evening Lecture.) (60 minutes).

CLARK, M. N., Claridge, Pa.:

1. Marketing the Products of the Farm.
2. To Grow the Peach Successfully.
3. Some of the Mistakes Many Farmers Make.
4. Theory and a Practical Education.
5. Has the Grange Helped the Farmer?
6. A Money Maker, "Grow Hogs."
7. What Has Become of the Horse Growers?
8. Beautify the Home and Surroundings. (25-30 minutes each).

CONARD, DR. M. E., Westgrove, Pa.:

1. Selecting, Feeding and Raising the Calf to Build Up the Dairy Herd.
2. Cow Stable Construction; Sanitary and Comfortable.
3. Essential Points in the Production of Wholesome Milk.
4. Selecting and Breeding Horses for Farm and Market.
5. Comparative Types and Characteristics of the Dairy Breeds. (Illustrated with Lantern Slides).
6. The Modern Dairy, Equipment and Methods. (Lantern Slides).
7. Concrete Construction for the Farm. (Illustrated with Lantern Slides).
8. The Babcock Milk Tester. (Demonstrated.) (For Movable School only.) (30-60 minutes each).

CARD, FRED. W., Sylvania, Pa.:

1. Soil Management.
   (a) The Soil Laboratory.
   (b) A Farm Fertilizer Factory.
2. Farm Management.
   (a) The Business Organization of the Farm.
   (b) Records and Accounts.
3. Fruit Growing.
   (a) Growing the Tree.
   (b) Producing the Crop.
   (c) Business Problems Involved.
   (d) Bush-Fruits and Strawberries.
4. Picture Planting on the Lawn.
5. The Pig in Poke, Pen, Pasture and Parlor.
6. Some Mistakes I Have Made.
7. The Call of the Land.
8. Some Lessons at School. (Evening.) (30-45 minutes each).

COX, JOSEPH F., State College, Pa.:

1. Farm Drainage.
2. Turning the Soil.
3. The Importance of the Soil Water and Methods of Conservation.
4. Increasing the Water Holding Capacity of Droughty Soils.
5. Improving Pennsylvania Soils.
6. Crop Adaptations of Pennsylvania Soils.
7. The Soil Survey and What it will mean to Pennsylvania.

CORNMAN, CHAS. T., Carlisle, Pa.:

1. Poultry Husbandry on the Farm.
2. Feeding and Housing Poultry Intelligently.
3. Eggs and What They Mean to the Farmer.
4. Poultry Diseases and Poultry Pests.
5. The Turkey Problem in Pennsylvania.
6. Birds of Pennsylvania; Their Value to the Farmer. (30 to 40 minutes each).

DARST, W. H., State College, Pa.:

1. Corn Improvement.
2. More Bushels of Corn per Acre.
3. Corn, Culture Methods.
4. The Corn Score Card and Methods of Judging.
5. Improving Wheat Yields.
6. Alfalfa.
7. Soiling Crops and Green Manures.
8. Soy Beans and Cow Peas.
9. Insects and Fungus Diseases of Farm Crops.
10. Potatoes.
11. Forage Grasses for Pennsylvania.
12. How Plants Grow.

DAVIS, H. P., State College, Pa.:

1. How Much Milk Per Acre?
2. Silos and Silage.
3. What Grains for the Dairy Cow?

4. Why Use a Pure Bred Sire?
5. The Essential Points for a Dairy Cow?
6. Dairying for Fun and Profit.

DORSETT, E. B., Mansfield, Pa.:

1. The Silo as a Factor in Dairying.
2. Earmarks of a Dairy Cow.
3. Building up the Dairy Herd.
4. The Feed and Care of the Dairy Cow.
5. Agriculture in Our Public Schools.
6. Organization for the Farmers.
7. Co-operation for the Farmers.
8. Good Roads, How to Build and Maintain Them.
9. America's Uncrowned Queen.

DRAKE, W. M. C., Volant, Pa.:

1. Improving our Corn by Breeding.
2. How to Grow Clover.
3. How we may Increase the Fertility of our Soil.
4. Buying and Using Commercial Fertilizers.
5. The Silo as an Economic Factor on the Farm.
6. Growing Commercial Orchard.
7. Raising Horses in Pennsylvania.
8. What Shall We Teach our Country Children.
9. What the Home May Do for the Child. (30-40 minutes each).

FASSETT, F. H., Meshoppen, Pa.:

1. Care and Management of the Orchard.
2. Pruning.
3. Some Orchard Insects and Their Control.
4. Handling and Marketing Apples.
5. Starting the Orchard.
6. Peaches; Planting and Care.
7. Strawberries. (30-40 minutes).

FERGUSON, J. A., State College, Pa.:

1. Trees to Plant in Pennsylvania for Fewer Posts.
2. How to Start a Farm Woodlot.
3. Care of the Woodlot.
4. Enemies of the Woodlot. (one hour each).

FOULKE, JEAN KANE, West Chester, Pa.:

1. Women's Place in the Farm Life.
2. The Women Farmer; Difficulties and Possibilities.
3. The Child on the Farm.
4. The Essentials of Good Butter Making.
5. Easy Ways to Health and Comfort.
6. Our Neglected Opportunities.
7. Agricultural Use of Dynamite. (Slides).
8. Our Friends—The Enemy. (Slides.) (40-50 minutes each).

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FUNK, DR. J. H., Boyertown, Pa.:

1. Commercial Orcharding. (45 minutes).
2. Pruning, Fertilizing and Thinning. (45 to 60 minutes).
3. Spraying. (45 minutes).
4. San Jose Scale and Other Insects. (45 minutes).
5. Small Fruits. (45 minutes).
6. The Peach and How to Raise It. (45 minutes).
7. How a Tree Grows. (Suitable for Schools.) (45 minutes).
8. Potato Culture. (45 to 60 minutes).
9. Birds and Insects. (Evening Lecture.) (45 to 60 minutes).

FUNK, SHELDON W., Boyertown, Pa.:

1. Apple Growing.
   (a) Starting the Young Orchard.
   (b) Treatment of Bearing Trees.
2. The Spraying of Fruit Trees.
3. Modern Peach Culture.
4. Small Fruit Culture.
5. Commercial Fertilizers and the Value of Home Mixing.
6. Market Gardening.
7. Potato Culture.
8. Flowers and Their Care in the Home and Lawn.
9. An Appeal to our Farmer Boys. (Evening lecture).
10. Some Wonders of Nature. (Evening.) (35-50 minutes each).

GARDNER, PROF. FRANK D., State College, Pa.:

1. Corn Improvement by Selection, Breeding and Testing.
2. Alfalfa and How to Grow It.
3. Use of Lime on Land.
4. Soil Fertility and How to Maintain It.
5. Principles of Fertilizer Practice.
6. Land Drainage.
7. Use of Concrete on the Farm. (Illustrated with Lantern Slides).
8. Value and Use of Farm Naures.
9. Farm Management.

GIVEN, G. C., State College, Pa.:

1. Lime.
2. Fertilizers; Home Mixing.
3. Bacteria in the Dairy.
4. Bacteria and Their Function.
5. The Wonders of Modern Chemistry. (25-30 minutes).

GOODERHAM, H. M., Patton, Pa.:

1. Barn Manures; Their Waste and Treatment.
2. Agriculture and our Rural Schools.
3. Adding Value to our Farms by Improving our Stock.
4. Butter Making on the Farm.
5. Growing Alfalfa.
6. The Boys and the Girls. (Evening lecture.) (30-40 minutes each).

GOODLING, C. L., State College, Pa.:

1. Economic Production of Milk.
2. Silos and Their Value.
3. Alfalfa Growing.
4. Fertilization of Grasses.
5. Home Mixing Fertilizers. (Illustrated).
6. Figuring Balanced Rations for Cows. (Illustrated).
7. The Economic Use of Farm Machinery. (Illustrated).
8. The Use of Lime on Land. (25-30 minutes each).

GORHAM, W. R., State College, Pa.:

1. Crop Rotations.
2. Silos and Silage.
3. Alfalfa.
4. Dairy Rations.
5. Fundamental Training in Agriculture.

GROUPE, J. STUART, Jersey Shore, Pa., R. D. No. 4:

1. Eighteen Years' Experience with Hogs.
2. Clover and Its Benefits.
3. Corn; Breeding and Culture.
4. Potato Growing for Profit.
5. Humus the Foundation of Soil Fertility.
6. Care and Handling of Stable Manure. (25-30 minutes each).

HARLAN, JAMES D., State College, Pa.:

1. Alfalfa; How to Grow It.
2. Commercial Fertilizers and Soil Fertility.
3. Fertilizing the Meadow.
4. Lime an essential in Maintaining the Productivity of the Soil.
5. Corn Improvement.
6. Selecting, Storing and Testing Seed Corn.

HAVNER, H. H. State College, Pa.:

1. Feeding Farm Work Horses.
2. Producing Draft Horses.
3. Tuberculosis.
4. Hog Diseases.
5. The Cow at Calving Time.
6. Prevention of Disease.

HERSHEY, H. F., Harrisburg, Pa., R. D. No. 2.:

1. Budding and Grafting.
2. The Orchard up to Bearing Age.
3. Summer Spraying of Peaches.
4. The Control of Orchard Enemies.
5. How to Make the Concentrated Lime Sulfur.
6. Strawberry Culture. (20-30 minutes each).

HIBSHMAN, E. K., Ephrata, Pa.:

1. Production of the Pennylvania Tobacco.
2. Tobacco Fertilizers.
3. Lime.

HERR, JOEL A., Millhall, Pa.:

1. Intelligent Use of Commercial Fertilizers. (30 minutes).
2. Modern Road Making. (20 minutes).
3. Building Up the Farm. (30 minutes).
4. Selection and Breeding of Dairy Cows. (20 minutes).
5. The Bright Side of Farm Life. (35 minutes).
6. What Has Organization Done for the Farmer. (30 minutes).
7. The Farmer as a Citizen. (20 minutes).
8. Raising Cows for Market. (20 minutes).
9. Specialities in Farming. (30 minutes).
10. The Clover Crop. (30 minutes).
11. The Value of Wood Lot. (15 minutes).

HULSART, CHAS. C., Matawan, N. J.:

1. Home Mixed vs. Commercial Fertilizers. (40-50 minutes).
2. Forms and Functions of Fertilizing Materials. (40 minutes).
3. Humus and Clover Crops. (35-40 minutes).
4. Asparagus Production. (50-60 minutes).
5. Plant Breeding and Seed Saving by the Farmer. 45 minutes).
6. The Early Tomato; How to Grow it for Profit. (60 minutes).
7. Cantaloupe Production. (40 minutes).
8. Essentials in Corn Growing. (45 minutes).
9. Truck Farming; The Man, the Business, the crops. (45 to 55 minutes).
10. Small Fruits; Raspberries and Strawberries. (40-45 minutes).

HUTCHISON, G. G., Warriors Mark, Pa.:

1. Comercial Feeding Stuffs as Found on the Market of Pennsylvania.
2. Citizenship. (Evening lecture.) (30 minutes).
3. How to Bring the Farm Lands up to a Higher Standard of Fertility and Productiveness.
4. The Farm Buildings; The House and Farm.
5. What is the Cause of the Cry in regard to High Cost of Living.
6. Pennsylvania and Its Great Resources. Evening lecture.) (25-30 minutes).

JOHNSTON, J. B., New Wilmington, Pa.:

1. Picking, Packing and Storing Apples. (20 minutes).
2. Results of Fertilizer Experiments in Mature Apple Orchard. (30 minutes).
3. Spraying; When, How and What For. (30 minutes).
4. Pruning; When, Why and What For. (30 minutes).
5. Installing Modern Conveniences in the Farm Home; The Cost. (30 minutes).

**KILPATRICK, MILLIGAN C.**, State College, Pa.:

1. Farm Poultry.
2. How to Save Money in the Poultry Business.
3. Fattening Poultry. (40-60 minutes).

**KESTER, R. P.**, Grampian, Pa.:

1. Fertility Regained and Retained.
   (a) Soil Moisture; Its Necessity and Control.
   (b) Humus; Its Function and Increase.
   (c) A Grass Sod; Its Necessity and How to Produce It.
   (d) The Economical Use of Lime, Manure and Fertilizers.
   (e) Tillage and Tilling Implements.
2. Growing a New Orchard.
3. Improving the Old Orchard.
4. Essentials of Success with Potatoes.
5. The Farmer as a Citizen.
6. The Education we Need.
7. Some Fundamentals of a Country Home.

Note: Subject No. 1 is sub-divided and these subjects may be used for a series of talks on fertility during an institute.

**KLINE, FRANK**, Spring City, Pa.:

1. Poultry Buildings, Past and Present.
2. Profitable Poultry and Winter Egg Production.
3. Incubation with Hens and Incubators.
4. Brooding and Rearing Chicks for Market and Breeders.
5. Poultry Breeding as a Business and the Best Method for a Beginner. (20-35 minutes each).

**KLEIN, DR. LOUIS A.**, Thirty-sixth and Woodland Avenue, Philadelphia, Pa.:

1. Facts of Value to Dairymen about Bacteria in Milk.
2. Principles of Sanitary Milk Production.
3. Inside the Cow's Udder. (Illustrated with charts).
4. Sterility or Barrenness in Dairy Cows. (30-45 minutes each).

**KRAYBILL, H. R.**, State College, Pa.:

1. Fertilizers for Tobacco. (35 minutes).
2. Handling of Pennsylvania Seedleaf Tobacco. (45 minutes).
3. Cultivation of Tobacco. (45 minutes).
4. Tobacco Breeding. (30 minutes).
5. Management of Tobacco Seedbeds. (35 minutes).

**LIGHTY, L. W.**, East Berlin, Pa.:

1. The Business of Dairy Production.
2. The Business of Marketing the Dairy Products.
3. The Silo as a Factor in Dairying.
4. The Summer Silo and the Soiling System.
5. Culture and Feeding of the Corn Crop.
6. Value, Care and Handling of Farm Manure.

7. Maintaining and Improving the Fertility of the Soil.
8. Some Requisites of the Modern Farm Home.
9. The Rural School; Some Suggestions for Improvement. (35-45 minutes each).

**MAIRS, PROF. T. I.,** State College, Pa.:

1. Horse Breeding for Farmers. (20-30 minutes).
2. Livestock and Soil Fertility. (20-30 minutes).
3. What is a Balanced Ration. (15-20 minutes).
4. School Training for Farm Life. (30-40 minutes).
5. Rural Sanitation and Hygiene. (20-30 minutes).
6. Alfalfa. (20-30 minutes).
7. Some Rural School Problems. (20-30 minutes).

**McCALLUM, MALCOLM H.,** Wernersville, Pa.:

1. Buying and Home Mixing Fertilizers.
2. Use of Commercial Fertilizers.
3. Alfalfa.
4. Forms and Use of Lime.
5. Essentials of Success with Potatoes.
6. Legumes; Their Relation to Crop Production.
7. Market Gardening. (Any phase Crop or Crops).
8. Things Worth While on the Farm. (Evening lecture.) (25-30 minutes each).

**McDOWELL, M. S.,** State College, Pa.:

1. Soil Fertility.
2. Fertilizing Grass.
3. Lime.
4. Science and Agriculture.

**McK. LYONS, MRS. HANNAH,** Lincoln University, Pa.:

1. Science in Home Making.
2. Health in the Home.
3. The Home we Live in or Hygiene of the Home.
4. Baths and Bathing.
5. Labor Saving.
6. What Shall we Eat. (30-40 minutes).

**MENGES, PROF. FRANKLIN,** York, Pa.:

1. Maintenance of Soil Fertility and Soil Moisture.
2. Fixation of Free Nitrogen.
3. Methods of Introducing Clovers into Rotation.
4. Methods of Raising Hay.
5. Economy in Crop Production.
6. Benefits of Corn Breeding.
7. Wheat Raising to Increase Yields.
8. Industrial Alcohol in Agriculture.
9. Necessity of Education for the Farmer.
10. Domestic Chemistry in the Country School.
11. Insect Life in Agriculture.

**MITMAN, HOWARD**, Hellertown, Pa.:

1. Helps and Hindrances in the Poultry Yard. (30 minutes).
2. Incubators and Brooders. (30 minutes).
3. Water the Greatest Thing on the Farm. (45 minutes).
4. Tillage, Preparation and Cultivation of the Soil. (30 minutes).
5. Concrete on the Farm (Illustrated.) (30 minutes).
6. Essentials of the Country Home, Real and Imaginary. (40 minutes).
7. Books and Periodicals; How to Choose Them and How to Use Them. (30 minutes).
8. Soil Erosion; Soil Waste. (30 minutes).

**MONROE, MRS. GEO. E.**, Dryden, N. Y.:

1. Farm Poultry General.
2. The Farm House.
3. Home Sanitation (Water Supply and Sewerage disposal).
4. The Farmers' Boys and Girls at School.
5. What a Woman Can do on the Farm.
6. Canning and Preserving; Household Conveniences.
7. Poultry.
   (a) The Little Chick to the Laying Hen.
   (b) Breeding and Feeding the Flock. (30-40 minutes each).

**NOLL, C. F.**, State College, Pa.:

1. Potatoes. (30 minutes).
2. Alfalfa. (30 minutes).
3. The Care of Pasture Land. (30 minutes).
4. Principles and Methods in Plant Breeding.
5. Conservation of Soil Moisture. (30 minutes).

**ORTON, C. R.**, State College, Pa.:

1. Some Important Fungus Diseases on the Farm.
2. Orchard Diseases with Methods of Control.
3. The Diseases of our Trees and How to Combat Them. (50-60 minutes each).

**PATTON, W. M.**, Mosgrove, Pa.:

1. Planting and Care of the Farm Orchard.
2. Lime; How, When and For What to Use it.
3. The Possibilities of Alfalfa and How We Grow It.
4. Potato Growing for Profit. (On a small scale).
5. Clover Growing as a Soil Renovator.
6. Marketing the Products of the Farm.
7. Caring for the Soil.
8. The Little Red School House as I Knew It. (30-40 minutes each).

**PEACHEY, J. H.**, Belleville, Pa.:

1. Alfalfa.
2. The Clover Crop and How to Grow It.
3. Butter Making on the Farm.
4. Rural School Problems.

5. Corn Culture.
6. Breeding and Feeding the Pig.
7. Soil Improvement.
8. The Home on the Farm.
9. Goodby; Take Care of the Farm.

**PHILLIPS, E. L.**, New Bethlehem, Pa.:

1. Construction of Poultry Houses.
2. Beginning the Poultry Business.
3. How to Buy Commercial Fertilizers and How to Use It.
4. The Need of Lime in the Soil.
5. Good Roads; How to Get Them.
6. Poultry (Illustrated by lantern slides.) (25-30 minutes each).

**PLESSINGER, FRANK P.**, Locust Grove, Pa.:

1. Commercial Strawberry Growing.
2. Commercial Raspberry Growing.
3. The Farmer's Small Fruit Garden.
4. The Story of a Run Down Farm. (30-40 minutes each).

**POSTEN, B. MONROE**, Stroudsburg, Pa.:

1. When will the Prodigal return or when can the Farmer Kill the Fatted Calf. (Evening lecture).
2. Stopping the Leaks that Mortgage the Farm.
3. Hendom from a Clergyman's Standpoint.
4. The American Hen and the American Farmer.
5. When Springtime, call the Roll.
6. Poultry Buildings and How to Feed.
7. The Secret of Success with Horses.

**PUTNEY, FRED. S.**, State College, Pa.:

1. Breeding Dairy Cattle.
2. Feeding Dairy Cattle.
3. Managing Dairy Herd.
4. Raising the Dairy Calf.
5. The Dairy Heifer.

**ROW, CHAS. A.**, Yardley, Pa.:

1. Growing and Selecting Corn. (35-40 minutes).
2. Building Up the Dairy Herd. (30-40 minutes).
3. Feeding the Dairy Cow. (35-40 minutes).
4. Home Mixing Fertilizers. (35-40 minutes).
5. Increasing Soil Fertility. (35-40 minutes).
6. Distribution and Eradication of Weeds. (20 minutes).
7. Educational Value of Agricultural Fairs. (Evening lecture). (25 minutes).
8. Advantages of an Agricultural Education. (Evening lecture.) (35-40 minutes).

**SEEDS, ROBT. S.**, Birmingham, Pa.:

1. Value of Barnyard Manure. (30 minutes).
2. Soil Improvement—The Keystone to Agriculture. (30 minutes)

3. The Value of Fertility and the Cheapest Way to Get It.
4. Education and the Farmer. (20 minutes).
5. Benefits Derived from Farmers' Institutes. (20 minutes).
6. What Constitutes a Country Home. (45 minutes).
7. Mistakes of Life Exposed. (60 minutes).

SEVERSON, B. O., State College, Pa.:

1. Beef Production in Pennsylvania.
2. Value of Pasture for Hogs.
3. Value of Corn Silage as a Feed for Livestock.
4. Growing Horses in Pennsylvania.
5. Raising Sheep for Market.
6. The Adaptability of Sheep Raising to Pennsylvania.
7. The Value of the Pure Bred Sire. (30 minutes each).

STEPHENS, A. WOODWARD, Hoboken, Pa.:

1. Fruit Growing.
2. Co-operation in Farming.
3. Soil Fertility.

STEVENS, PROF. F. R., Agriculturist.:

1. The Feeding of Animals.
2. Lime and Its Relation to the Rotation of Crops.
3. Alfalfa.
4. The Conservation of Soil Moisture.
5. Lime and Its Uses.
6. How Plants Feed and Grow.

STOUT, W. H., Pinegrove, Pa.:

1. Fruit Growing.
2. Manures and Fertilizers.
3. Geological Observations.
4. Soil Characteristics.
5. Potato Growing.
6. Maintaining Fertility.
7. Nature's Laboratory.
8. Tenant Farming.
9. Bee Keeping (Illustrated with lantern slides).
10. Tile Drainage.
11. Views of Hygiene in Country and Village. (30 minutes each).

TOMHAVE, W. H., State College, Pa.:

1. Beef Production in Pennsylvania.
2. Feeding Silage to Farm Animals.
3. Profitable Pork Production.
4. Horse Breeding in Pennsylvania.
5. Sheep for the Pennsylvania Farmer.
6. Community Breeding of Livestock.
7. Curing Meat on the Farm. (25-30 minutes each).

**UMHOLTZ, R. O., Sacramento, Pa.:**

1. Hatching the Chick.
2. Raising the Chick.
3. The Housing of Poultry.
4. The Feeding of Poultry.
5. Lice and Mites,
6. Utility or Eggs and Meat.
7. Fancy or How to Breed; Condition and Exhibit.
8. Lessons from the Egg Laying Contests. (20-30 minutes each).

**VAN NOY, LEON OTICE, Troy, Pa., R. D. No. 66:**

1. How to Lay a Foundation for a Dairy Herd.
2. Feed and Care of the Dairy.
3. Making Butter on the Farm.
4. The Silo.
5. Swine as a Side-line with the Dairy.
6. Soil Fertility.
7. The Care of Milk.
8. Experience with Milking Machines.
9. Pertinent Points of Dairying. (20-35 minutes each).

**WARNER, DAVID E., State College, Pa.:**

1. Preparing Poultry for Market.
2. Advantages of Caponizing.
3. The Value of Keeping Records.
4. The Care of Baby Chicks.
5. Sanitation in Poultry Keeping.
6. Rearing and Management of Turkeys. (30-40 minutes each).

**WATTS, D. H., Kerrmoor, Pa.:**

1. The Apple Orchard and Its Care.
   (a) Starting an Orchard.
   (b) Orchard Tillage.
   (c) Fertilizing the Orchard.
   (d) Tree Diseases, Insects, Spraying.
2. Peach Culture.
3. Building up the Dairy Herd for Profit.
4. Economic Feeding of the Herd.
5. Alfalfa; Its Value and Culture.
6. How to Make and Sell Gilt-Edge Butter.
7. Farm Buildings and Blunders.
8. Our Education.
9. The Soil and Plant Nutrition.

Note: Any of the above sub-divided topics can be given separately.

**WELD, R. J., Sugargrove, Pa.:**

1. The Selection of the Dairy Cow.
2. The Breeding of the Dairy Cow.
3. The Feeding of the Dairy Cow.
4. The Dairy Herd Records.
5. The Babcock Test on the Dairy Farm.
6. Butter Making on the Farm.
7. Crops for the Dairy Farm. (20-30 minutes each).

WHITE, JOHN W., State College, Pa.:

1. Phosphatic Fertilizers.
2. Functions of Lime and Magnesia in Soils.
3. Rational Use of Lime in Agriculture.
4. Nitrogenous Fertilizers.

WHITE, W. R., State College, Pa.:

1. Strawberries.
2. Fruit Growing.
3. Pruning.
4. The Use of Concrete on the Farm.
5. The Central Township High School. (30-40 minutes each).

WITTMAN, W. THEO., Mt. Gretna, Pa.:

1. Poultry; Knowing More About It.
2. Poultry; Breeding.
3. Poultry Houses; Construction. (Illustrated with lantern slides).
4. Poultry; Feeding.
5. Poultry; Incubation and Rearing.
6. Poultry; Making Hens Lay in Winter.
7. Poultry Houses; Good and Bad. (Illustrated with lantern slides).
8. Forty Popular Varieties of Poultry in Natural Colors. (Illustrated with lantern slides).

WORTHEN, E. L., State College, Pa.:

1. The Relation of Lime to Soil Improvement.
2. Organic Matter and Nitrogen.
3. The Economic Use of Fertilizer.
4. Practical Conclusions from the Pennsylvania Plat Experiments.
5. Stable Manure.
6. Legume Crops and Soil Improvement.
7. Soils of Pennsylvania.
8. Principles of Tillage.

WRIGLEY, PAUL I., Eddington, Pa.:

1. Asparagus Culture.
2. Corn Culture.
3. Hay.
4. Commercial Fertilizers.
5. Green Manuring Crops.
6. Soiling Crops for Dairy Cows.
7. Balancing Rations.
8. Weeds and How to Get Rid of Them.
9. Farming as a Business.
10. The Use of Lime. (20-40 minutes each).

ZINN, W. D., Phillippi, W. Va.:

1. Permanent Pastures.
2. Adaptation of Livestock to the Farm.
3. Intelligent Use of Commercial Fertilizer.

4. Alfalfa and How to Grow It.
5. Factors that Control Soil Fertility.
6. Farm Manures; How to Save and Apply.
7. Reason for the Application of Lime.
8. Rotation of Crops.

## LIST OF SPECIAL INSTITUTE INSTRUCTORS

A. R. Bechtel, State College, Pa.
W. M. Benninger, Walnutport, Pa.
M. N. Clark, Claridge, Pa.
W. M. C. Drake, Volant, Pa.
J. A. Ferguson, State College, Pa.
Dr. Wm. Frear, State College, Pa.
W. R. Gorham, State College, Pa.
J. D. Harlan, State College, Pa.
H. F. Hershey, Harrisburg, Pa., R. D. No. 2.
Joel A. Herr, Millhall, Pa., R. D.
G. G. Hutchison, Warriors Mark, Pa.
Prof. M. C. Kilpatrick, State College, Pa.
Prof. T. I. Mairs, State College, Pa.
M. S. McDowell ,State College, Pa.
Mrs. Mary T. Monroe, Dryden, N. Y.
C. R. Orton, State College, Pa.
Frank P. Plessinger, Locust Grove, Pa.
B. Monroe Posten, Stroudsburg, Pa.
A. Woodward Stephens, Hoboken, Pa.
R. O. Umholtz, Sacramento, Pa.
J. W. White, State College, Pa.

## DEPARTMENT LECTURERS

In so far as time and circumstances will permit, the officers of the Department of Agriculture are desirous of engaging in Institute work.

In order to prevent disappointment in the arrangement of programs, it is recommended that Institute Managers first consult the individual whose services they may wish to secure, before placing his name on the program.

Department lecturers come to these Institutes free of charge, except that they are to be taken from and to the railroad station at the expense of local managers. The topics which they will discuss can be procured by addressing the following officers of the Department of Agriculture:

HON. N. B. CRITCHFIELD, Secretary of Agriculture.
HON. A. L. MARTIN, Deputy Secretary and Director of Institutes
JAMES FOUST, Dairy and Food Commissioner.
PROF. H. A. SURFACE, Economic Zoologist.
DR. C. J. MARSHALL, State Veterinarian.

# BIOGRAPHICAL SKETCHES OF THE INSTITUTE LECTURERS

**H. M. ANDERSON** was born August 26th, 1874, on the farm which he has recently purchased from his father. He graduated from the York Collegiate Institute in 1894, since which time he has devoted practically all his time to agricutlure. Has been for quite a number of years growing very profitable farm crops in what has until very recent years been called the York County Barrens. He is particularly interested in growing alfalfa potatoes and corn and is doing experimental work with these crops; has an apple orchard of which he is very proud and is a close student of modern methods of increasing soil fertility.

**R. H. BELL** was reared on a farm in Huntingdon county, Pennsylvania, receiving early schooling in the district schools and later prepared for teaching at Juniata College and Lock Haven State Normal. After teaching for more than three years, entered the Pennsylvania State College from which he graduated in 1910 with a degree of B. S. in Agriculture. Since graduation have, with the exception of one year in practical work, been engaged in scientific research work at the Pennsylvania Experiment Station. In addition, have done some teaching My station experience has had to do entirely with horticultural subjects. At the present time, am connected with investigational work on orchard fertilization together with a study on different cultural methods.

**M. S. BOND** was born on a farm in Montour county, Pa., February 26, 1834; lived and worked on a farm until eighteen years old, then taught school seven years, then was employed as a freight and passenger conductor for nine years and traveled as lost freight and car tracer and purchasing agent for the Delaware, Lackawanna and Western Railroad Company for five years. Has been for over twenty-five years engaged in farming and market gardening; during a part of this time, engaged in breeding and raising blooded Jersey cattle and still keeps some of the best in the State; has made the raising of potatoes by the thousands of bushels a specialty for twenty-five years; has been and is now using more fertilizer to the acre than any man in his county, and is now making gardening a specialty.

**CHARLES M. BARNITZ** began the study of poultry culture twenty-five years ago and now conducts a model up-to-date poultry plant at Riverside, Pa., and is a recognized authority on poultry. His success and expert articles in the poultry press of the United States and Europe attracted the American Press Association, the greatest newspaper syndicate in the world. He accepted a place on their staff as editor and artist of their poultry feature, and his poultry writings are now read by millions of people throughout the United States. His modern and extensive plant at Riverside is a practical and profitable one and interesting experiments with land and water fowl afford much valuable data for platform and press.

**FRED W. CARD** was born at Sylvania, Pa., in 1863. Attended the common schools and the Mansfield State Normal, from which he graduated in 1880. He taught three years in the public schools and took a business college course, after which he spent five years in gardening and small-fruit growing. In the fall of 1889 he entered Cornell University and completed the regular course in agricultural in 1892. He was then granted a fellowship and remained for graduate work the following year, receiving his master's degree in 1893. He was appointed assistant in horticulture at the Cornell University experiment station, but resigned in a short time to become associate professor of horticulture at the University of Nebraska, remaining in this position for five years. In 1898 he became professor of horticulture at the Rhode Island College of Agriculture and Mechanic Arts, and in 1901 professor of agriculture as well. This position he resigned in 1897 to engage in actual farming on the farm where he was born, which he had purchased while in Nebraska.

**HON. W. M. BENNINGER** was born in Lehigh Gap, Pennsylvania, in 1854, in the same year his parents moved across the river to Lehigh Township, Northampton County, Pa., where he has since remained and where his noted stock farms, slate quarries, etc., are located. In addition to a common school education he attended the Keystone State Normal School, he was raised and worked on his father's farm up to 1873 when he started in business for himself. He is well and favorably known as a breeder and exhibitor of Holstein Friesian cattle and is an expert cattle judge, he is also well known as a lecturer, having been on the Pennsylvania State Grange Lecturers' staff and Farmers' Institutes and is a well known contributor to leading agricultural and stock breeding journals. He served as Post Master at Walnutport, Pa., and also at Benningers, Pa., he was corporal of Company H, of the 4th Regiment of Infantry from which he was honorably discharged in 1884 by reason of expiration of enlistment. He is Secretary of the Pennsylvania Holstein Friesian Association and is a member of the House of Representatives from Northampton County.

**J. T. CAMPBELL** was born in Springfield township, Fayette county, Pa., December 18, 1872; is the son of a prominent farmer; received his early education in the public schools of his native district; left the public schools with a more than average education and at once took up the study of agriculture at home, while working on his father's farm; he studied carefully all leading books and journals of his day. Married in 1894, and took up gardening and poultry culture, and was successful from the start. When the Pennsylvania State College started its correspondence courses in agriculture he took up the work and has since pursued same with dilgence. Owns a large farm in Crawford county, upon which he has worked out many important agricultural problems. In poultry culture he has been exceptionally successful, having made it a subject of special study, together with soil physics. Keeps in close touch with the State Experiment Station and the National Department of Agriculture; has written some for various agricultural and poultry journals.

**M. N. CLARK** was born near Export, Westmoreland county, Pa., July 16, 1848; received a good common school education, with several years at an academy and a full course at Duff's Commercial College, at Pittsburgh; has always taken much delight in farming; as a close observer, and for many years has taken an active interest in agricultural affairs of his county; the cause of education has always found in him an earnest supporter; has been engaged in general farming from boyhood, except a few years spent in selling implements; was several seasons in the fruit growing regions of the south, and there gained much information in the use of commercial fertilizers and fruit growing; was a member of the State Board of Agriculture for ten years, and at present is looking after the interest of his farm.

**DR. MILTON E. CONARD** was born in southern Chester county, of an ancestry of successful agriculturists. He obtained his education in the public and high schools and Millerville State Normal School. He was for some years engaged in farming in his home locality; later taking the course in veterinary medicine at the University of Pennsylvania, in which institution he was for 16 years lecturer of Dairy and Milk Inspection and Veterinary Obsterics. Throughout his veterinary career he has been closely identified with dairy interests, practicing for some years in a dairy locality, and having for over ten years given his entire time as Inspector and Consulting Expert for a large number of the dairies furnishing milk to the City of Philadelphia, from Pennsylvania, New Jersey, Maryland and Delaware.

**CHARLES T. CORNMAN**, Carlisle, Pa., was born at Carlisle, Pa., April 15, 1863. He received a common school education. For twenty-five years he was one of the largest breeders and exhibitors of poultry in America for several years operating a plant covering fifty acres devoted to the breeding of high class show birds for exhibition purposes and with it a large utility plant. He is licensed by the American Poultry Association as a General Judge of poultry and as a National Lecturer on poultry topics. He has served as judge at the Pan-American, Universal and Jamestown Expositions and at the present time is on the advisory board of the Panama-Pacific Exposition to be held in San Francisco, California. He is Editor in Chief of The Poultry Item, the largest Journal published in the interests of poultry in Pennsylvania and the second largest in the United States. At the present time he holds executive positions in a number of the largest specialty clubs in America.

**W. M. C. DRAKE** was born in Lawrence county, August 16, 1860. He was educated at the public schools and a Normal School at New Castle, Pa., passing a teachers' examination. He has spent all his life on the farm; was president of the Farmers' Alliance in Lawrence county one term. He has been for several years past in partnership with his brother, operating 600 acres of land, besides a market garden and an extensive orchard.

**W. H. DARST** was born on a farm in Miami county, Ohio, in the year 1884. After completing a high school education he rented a farm and farmed for two and one-half years. He then entered the Agricultural College of the Ohio State University taking the bachelors degree in the year 1910. During the year 1910, and until the fall of 1912 he was employed in the Agricultural Extension Department of the Ohio Agricultural College, as lecturer and demonstrator of Agronomy, more particularly of farm crops. Since September 1912, he has been employed by the School of Agriculture of the Pennsylvania State College as Assistant Professor of Agronomy, farm crops division.

**H. P. DAVIS** was born at Montagu, Michigan. In 1907 he was graduated from the Lamar, Missouri High school and in the fall of the same year entered the University of Missouri, from which Institution he graduated in 1911. While in attendance at the University he worked in the dairy barn under the direction of Professor C. H. Eckles, and also served as an assistant in the chemical laboratory for a time. In February 1911, he became assistant in Dairying at the University of Illinois, devoting his time to experimental and Advanced Registry work. In June 1911 he resigned this position to become assistant herdsman for Mr. C. D. Ettinger, a Guernsey breeder, and in the fall of that year showed for him at the National Dairy Show. In November 1911 he became Assistant in Experimental Dairy Husbandry at the Pennsylvania State College, which position he is holding at the present time. The College Dairy Herd is under his immediate supervision.

**E. B. DORSETT** was born on a farm in Richmond township, Tioga county, Pa., February 17, 1868. He received a common school education in the district where he lived, then attended the Mansfield State Normal School, from which he was graduated in 1896. Ten years were spent teaching during the winter months and farming during the summer. With the exception of six years spent in the Sheriff's Office at Wellsboro, he has always lived and worked on the farm. At present, he and his brother, S. C. Dorsett, own and operate a large farm in Mansfield township, making dairying a specialty. His work in the Grange as State Lecturer, has brought him in close touch with the farmers and farm operations throughout the State, and has given him a fund of knowledge that will be useful to him in his work as an institute worker.

**F. H. FASSET**, Meshoppen, Pa., was born June 3, 1855, in Windham township, Wyoming county, Pa., moved to Meshoppen township in 1869, to the farm where he now resides; was educated in the common schools and took a course in select schools in Meshoppen borough; has been actively engaged in the growing of tree fruits with marked success for the last twenty-five years; all up-to-date methods of orchard treatment, spraying and pruning have been in use; took up the business of growing small fruits for the market some 12 years ago and has met with fair success. Is President of Wyoming County Horticultural Society and in close touch with the fruit interests in this section.

**JEAN KANE FOULK** was born in Wilmington, Delaware. Was educated at the Misses Hebb's School of this city. Removed to Philadelphia and became a private teacher for two years Married George Rhyfedd Foulke in 1888 and removed to the mountains of North Carolina. After two or three years residence there they removed to the old Foulke homestead in Chester county, Pa. Here they became actively engaged in farming; joined the Grange and other agricultural associations. Since her husband's death in the autumn of 1901 Mrs. Foulke has continued the management of her own farm and in addition to that of other places in her vicinity.

**WILLIAM FREAR** was born in 1860, in Reading, Pa. He was educated in the public schools of that city and of Norristown, entered the preparatory and later the collegiate department of Bucknell University, graduating in 1881; pursued a post graduate course at Illinois, Wesleyan and Harvard Universities. Spent the growing season of the year during his childhood and youth at work upon a Pennsylvania farm; was made Assistant Chemist to the United States Department of Agriculture, 1883-5, and was engaged in sugar beet products and cereals. In 1885 he was elected professor of agricultural chemistry in the Pennsylvania State College and in 1887 was made vice director and chemist to the Pennsylvania State College Experiment Station. In 1888 he was elected chemist to the Pennsylvania Board of Agriculture, and in 1895 chemist to the Pennsylvania Department of Agriculture. He was also president of the National Association of Agricultural Chemists.

**J. H. FUNK, M. D.**, 6th generation from Bishop Henry Funk, who emigrated from Holland in 1719 was born in Lower Providence, Montgomery county, Pa., was brought up on his father's large dairy farm; attended public schools in the winter. In 1859-1860 attended Freeland Seminary (now Ursinus College); began the study of medicine in the spring of 1863 and received his diploma as Doctor of Medicine from the University of Pennsylvania in the spring of 1865; opened the first drug store in Boyertown and run it several years in conncetion with the practice of medicine. Served several years as the Burgess of Boyertown, also as Town Councilor, and eight years as School Director. Always being in love with horticultural pursuits, he planted a large orchard in 1879. In the year 1896 he planted another apple and peach orchard and has continued planting until he has about fifty acres of the most profitable orchards in the State. Such a thing as "off-year" bearing is unknown in these orchards. Was several years Pennsylvania State Pomologist. He wrote Bulletin No. 152, "Fruits for Pennsylvania." He is now devoting his entire time to raising fruit on the best modern principles. In winter he has been for a number of years on the lecture force at Farmers' Institutes.

**J. A. FERGUSON** is a graduate of Yale Forestry School, served a season with the U. S. Forestry School in Idaho. Began teaching Forestry at State College in 1908, established Forestry School at University of Missouri in 1911, is now head of Forestry Department, Pennsylvania State College, was born 1873 at Canandaigua, N. Y., graduated Hamilton College 1896, taught 10 years before studying forestry.

**SHELDON W. FUNK** was born in Boyertown, Berks county, Pa., May 7, 1888. He has a good high school education and also took a course at Perkiomen Seminary. From childhood he had been brought up among truck and fruit; five years of which were spent in Florida in the same vocation. For the last three years he has been in the greenhouse truck and fruit business with his father. Has had thirteen years' experience in the greenhouse, among the vegetable plants and the common flower.

**G. C. GIVEN** was born in Auburn, Maine, received the Degree of B. S., from New Mexico Agricultural College in 1906., M. S. from Pennsylvania State College in 1910, was Assistant Chemist Pennsylvania State College Agricultural Experiment Station 1907-1910, and is now Assistant Professor of Experimental Agricultural Chemistry at State College.

**H. M. GOODERHAM** was born and reared on the farm where he now resides and cultivates in Cambria county He was educated in common schools academy at Carrolltown, Pa., and Ohio Normal University, Ada, Ohio. After teaching in common schools for several terms, he took up farming and experimental work, which he has followed successfully ever since. He has throughout his life been very much interested in education and uplifting of his brother farmer and his family. He has held several public offices of trust and at one time was a member of the State Board of Agriculture and at that time holding the distinction of being the youngest member on the Board in the State. He is at present treasurer of the Cambria County Horticultural Society.

**PROFESSOR FRANK D. GARDNER**, head of the Department of Agronomy of the Pennsylvania State College and Experiment Station was born and raised on a farm in Illinois and graduated from the College of Agriculture of the University of Illinois in 1891. For four years after graduation he was Assistant Agriculturist to his alma mater. He then served the National Department of Agriculture as Field and Laboratory Assistant, as Director of the Porto Rico Experiment Station and Chief of the Division of Soil management. From the last named position he came to State College in his present capacity.

**C. L. GOODLING** was born in Loganville, York county, Pa., in 1885. He attended the public schools and York County Academy; entered the Pennsylvania State College 1903 and graduated 1907. After graduation was Assistant in the Dairy Husbandry Department, Pennsylvania State College, until December 1909; since December, 1909, Superintendent of the farms of the Pennsylvania State College, State College, Pa.

**JOEL A. HERR** was born in Clinton County, Pa., and educated in the public schools and at Dickinson Seminary. He served in the Civil War and has been a student, teacher and farmer all his life. He lives on his farm and gives special attention to fruit culture nad stock raising. He is a member of the State Board of Agriculture.

**H. H. HAVNER** was born in Wayne county, Iowa, November 11, 1888. He had his early school training at a district school and later graduated from the Corydon Iowa chool. In 1906 he entered the Iowa State College at Ames, Iowa, where he took a combined course of Animal Husbandry and Veterinary Medicine. After receiving a degree of Doctor of Veterinary Medicine, Mr. Havner practiced his profession in Cumberland, Iowa. In the fall of 1911 he was tendered the position of Veterinarian at the Pennsylvania State College. Mr. Havner has been in close touch with the handling and breeding of livestock since a boy. Prior to and after graduating from college he assisted in the management of livestock on a large farm in Southern Iowa. His practical experience has aided him very materially in his chosen field of work.

**JAMES D. HARLAN** was born and reared on a farm in Cumberland county, Pa. He obtained his early education in the common schools and prepared for college at Conway Hall, Carlisle, Pa. In September of 1908 he entered the School of Agriculture of The Pennsylvania State College, from which he graduated in June 1912. Since graduation he has been employed as Assistant in Experimental Agronomy at the Pennsylvania Agricultural Experiment Station.

**EDWARD K. HIBSHMAN** was born and raised on a tobacco farm near Ephrata, Lancaster county, Pa. After completing the course in the Ephrata schools, he entered the Pennsylvania State College and graduated from that institution in 1900 with the degree of B. S. in Agriculture. Since that time he has been employed by the Pennsylvania State College as Field Assistant to the Department of Experimental Agricultural Chemistry, and has been in charge of the field work of the tobacco experiments. In the spring of 1910 he was appointed a special Collaborator in the tobacco investigations of the Bureau of Plant Industry, Washington, D. C.

**GEORGE G. HUTCHISON**, born on a farm in Warriors Mark Township, Huntingdon County, Pennsylvania, a farmer for a number of years, have been connected with the Department of Agriculture since 1895, at the present time is General Agent of said Department, have made a study of Agriculture for many years, am a Trustee of Pennsylvania State College, have devoted my best energy to advancing the College in all lines, but especially along agricultural lines, have been a member of the State Board of Agriculture for a number of years.

**J. B. JOHNSTON** was born in Lawrence county, Pa. Was graduated from Westminster College at New Wilmington, Pa., in the class of 1876. Taught in public schools and traveled in the Western States. In 1884 he bought the farm he now owns and commenced planting a commercial orchard. These plantings have been continued until he now has 50 acres in the large fruits—40 acres in bearing, and 10 in young trees. He followed dairying and trucking for a few years until his orchard came into bearing. He is a firm believer that the farmer should receive a larger share of the consumers dollar. In 1908 the Pennsylvania State Experiment Station established a fertilizer experiment in his orchard and the wonderful results of the use of chemicals induced him to use the same methods on his whole orchard. And the results have been a surprise to all who have seen the crops produced. His equipment is up-to-date in the house, the barn, the farm and the orchard. His farm has changed from a run-down tenant farm to a very productive and profitable one.

**R. P. KESTER** was born in Clearfield county, Pa., January 18, 1867. He now resides on the farm which his maternal great grandfather "took up" and partially cleared nearly 100 years ago. It was farmed for 80 years in the old way and the fertility was depleted until it was one of the worn-out farms. During the past few years Mr. Kester and his younger brother have been farming and dairying by modern methods, until now even five blades of grass grew where one grew before. Fruit, poultry and trucking receive attention. He was fifteen years a teacher and always a close student. By learning from others and by experiments they are making the homestead farm pay.

**FRANK KLINE** was born in 1869 in Spring City, Chester county, Pa., of Pennsylvania born parents. Not being so fortunate as to be born and raised on a farm, having lived in a farming district he has been an observer of nature's works and while young took a great fancy to chickens and pigeons, which he has bred since twelve years of age. In 1895 he began to breed pure breed chickens both for utility and fancy. As a fancier he has exhibited in many of the largest shows in the United States, winning hundreds of regular and special prizes. At present his specialty is R. C. Rhode Island Reds, which have been handled with success for several years with the early hatching and rearing of chicks for both market and winter egg producers a special feature. His breeding yards are about his home in Spring City, where the public who are interested in poultry culture are welcome at all times.

**L. W. LIGHTY** was born in York county, Pa., 1857; attended the public schools of his neighborhood; afterwards attended a select school in Adams county and then taught school for seven winters. During this time he attended the York County Academy one term and also attended the State Normal School at Millersville. He then kept store, but not liking the business he got out of it and started in the poultry business, keeping both market and fancy poultry, and engaged in bee keeping and the culture of small fruits. In 1893 he purchased the farm upon which he now lives. The land was worn out and the buildings quite dilapidated. He has improved this until it is now one of the best farms in his county. He has a large library of standard books, keeps a selected dairy of cows, and has all the modern improvements needed to equip a first-class farm.

**CHAS F. NOLL** was born and raised on a farm at Green Park, Perry county, Pennsylvania. His early education was secured in the public schools, the New Bloomfield Academy and the Cumberland Valley State Normal School and from the last he was graduated in 1900. Five years he spent as teacher in the public schools after which he took the Agricultural course in the Pennsylvania State College from which he was graduated in 1906. Then he was field assistant in the Department of Agriculture at Harrisburg for one year, and manager of the Nostrand Fruit Farm on Shelter Island, New York, for one year. In 1908 he went to the Pennsylvania State College to engage in the investigational work which he has followed since then except for one year (1910-11) spent in graduate work at Cornell University. At the Pennsylvania Experiment Station he has charge of the field experiments along agronomic lines, which include investigations with cereals, forage crops, potatoes, plant breeding and liming and fertilizer treatments.

**MALCOM H. McCALLUM** is a Berks countian by birth, born, however, of Scotch parentage, and "dyed deep in the wool" in truck and fruit raising, his father, James McCallum, being the pioneer celery and fruit grower for the Reading markets. He is in the prime of life. He was educated in the common schools of Berks county, Pa., Butler University, Indianapolis, Indiana, and the University of Pennsylvania, Philadelphia, Pa. In 1904 he was chosen farm and garden superintendent of State Asylum, Wernersville, Pa., which position he now holds.

**THOMAS I. MAIRS** spent his early life upon a stock farm and graduated from the College of Agriculture of the University of Missouri in 1896. He took graduate work at the Michigan Agricultural College, the University of Illinois, and the University of Missouri. He was superintendent of field experiments at the Universiy of Illinois in 1896-7, and Assistant in Agriculture at the University of Misouri from 1897 to 1901. Since he has been connected with the Pennsylvania State College. He is now Superintendent of Correspondence Courses and Professor of Agricultural Education. He has taught dairy and animal husbandry and has had charge of the experiment work along these lines.

**M. S. McDOWELL** was born in Mifflin county, Pa., attended the public schools, and Lewistown Academy; entered Pennsylvania State College in 1888, and was graduated in 1892; after graduation was connected with a fertilizer manufacturing establishment in Baltimore, and later came to the Chemical Department of the Experiment Station, with which he has been connected for some years.

**PROF. FRANKLIN MENGES, Ph. D.**, was born forty-six years ago at Menges Mill, York county, Pa.; the first nineteen years of his life were spent on his father's farm with all the ardour that farming meant in those days; he then began a course of preparation for college at the Baugher Academy, Hanover, Pa., and entered and graduated from Pennsylvania College, Gettysburg, with the class of 1886; was immediately tendered and acepted the position of assistant professor of chemistry in his Alma Mater, which position he held until 1896, when he came to York and took the professorship of the sciences in the York High School, which position he now holds; received the degree of Ph. D. from his Alma Mater for special work in chemistry, mineralogy and physics. He has for years been a student of the "Experiment Station Record," and has continued an interest in practical agriculture and has lectured before Farmers' Institutes.

**J. H. PEACHEY** was born in Mifflin county, Pa., in 1852; his early life was spent on the farm which he now owns; received his early education in the public schools; taught school for a number of terms in Pennsylvania and Ohio; graduated in the scientific course from the Ohio Normal University of Ada in 1881. Continued teaching until driven from the school room because of ill health; be began farming in 1887. Following general farming for a few years, he began specializing in the dairy-making butter for a special trade; and growing hogs. Disposing of his dairy a few years ago his attention is directed toward the growing of the peach and apple. He is deeply interested in the new agriculture, believing that clear thinking and right living will elevate the farmer.

**F. S. PUTNEY** was born on a dairy farm in New Hampshire. In 1901 he was graduated from the Concord High School and the following year entered the New Hampshire State College from which he graduated in 1905 after which he secured a position on a pure bred Jersey farm and a few months later was appointed Assistant in Animal Husbandry and Agronomy at the Pennsylvania State College from which institution he received his Master's degree in 1908. The following year he received a fellowship at the University of Missouri where he made a special study of breeding as well as dairy cattle judging and stock management. In 1909 he was appointed Assistant to Dean and Director Mumford. After a year he was appointed Professor of Animal Husbandry at the Rhode Island State College which position he held until July 1, 1913, when he returned to the Pennsylvania State College as Assistant Professor of Dairy Husbandry.

**E. L. PHILLIPS** was born on his father's farm in Clarion county, Pa. Was educated in the common schools and a course in the High School at Reid Institute, Pa. Since then he has studied extensively in agriculture. Was married in 1885, after which he devoted his time to agriculture, owning and operating his 200 acre farm with profit to himself. Said farm is in Clarion county, Pa. He has devoted his farm chiefly to the production of fruits, live stock and grain suitable to that location and market. He has been an experimenter with various plant foods. His real estate holdings and commercial standing are a strong recommendation to himself and to the farm.

**WARREN G. ROSS** was born at Dunkard, Greene county, Pa., November 22, 1883. Early life spent on the farm; prepared for college at the West Virginia University Preparatory School, 1900 1904. Extended the course in agriculture at the Pennsylvania State College, February, 1905, graduated June, 1908. Was instructor in Agronomy at College Hawaii, Honolulu, 1908-1909. At present he is assistant in Agronomy at the Pennsylvania State College. Summer of 1910 engaged in field work for Bureau of Soils.

**CHARLES A. ROW** has lived on a farm all his life and done experimental work along various agricultural lines for the last six years. The two years previous to these were spent in the Ontario Agricultural College at Guelph, Canada, from which institution he received a diploma. He is now in business with his father on a large farm near Yardley. They are making a specialty of raising pure bred cattle and improving corn and wheat by plant selection.

**R. S. SEEDS** was born in Huntingdon county, Pa., 1852; was educated in the public schools and at the Shade Gap Academy. He was raised upon a farm and traveled for eighteen years among the farmers selling agricultural implements. In 1892 he bought a farm that had been run down, which he has greatly improved.

**B. O. SEVERSON** was born on a farm near Stoughton, Wis., December 9, 1887. He received his early education in a district school from which he graduated. On graduating from the Stoughton High School in 1906, he entered the University of Wisconsin, graduating from the Agricultural Course in 1910. During his University course, he specialized in Animal Husbandry. He has been engaged in teaching and experimental work along Animal Husbandry lines at the Pennsylvania State College since September 1, 1910. At present he holds the position of Assistant Professor of Animal Husbandry at that Institution.

**A. W. STEPHENS** was born in Westmoreland county, Pa., and received college training in this State, after which he went to Cornell University and was graduated from there in agriculture in 1900. For eight years he managed a successful co-operative store and while at Cornell made a special study of co-operation among fruit growers. He was orchard instructor for the Division of Zoology.

**W. H. STOUT** was born October 18, 1840, in Lower Nazareth township, Northampton county, Pa., was educated in the common schools and engaged in various occupations, serving an apprenticeship at coopering and milling, at clerkship and traveling salesman; has lived on his present farm for the past twenty-eight years, and is engaged in general farming, trucking, fruit growing and bee-keeping; has acquired practical and scientific information by observation and study; speaks English and German.

**LEON OTICE VAN NOY** was born in Troy, Pa., 1876, on a dairy farm. At the age of six years his father started in the pure blood cattle. Was educated in the public school, Troy High School and took special work in general agriculture and dairy farming for three years at the Pennsylvania State College. He returned and went into partnership with his father in the dairy business and made a number of experiments in feeding for profit. In the fall of 1900, he was forced to quit his father's farm on account of ill health and traveled for a few years. Was in and through 34 states. During this time he worked at a number of occupations besides farming. Had a great opportunity to compare city life with country life. In 1906 he returned to his father's farm and took the management of it. Has a private creamery and at the present time is trying to solve the problem of the direct route from the producer to consumer.

**WILLIAM HENRY TOMHAVE** was born at Fergus Falls, Minnesota December 19, 1881. He attended the common schools until fifteen years of age. At the age of eighteen he entered the Minnesota Agricultural High School at St. Anthony Park, from which he graduated in 1902. In the fall of 1903 he entered the College of Agriculture at the University of Minnesota, graduating in 1907. In the fall of 1907 he came to Pennsylvania State College as Assistant in Animal Husbandry. He resigned his position in the spring of 1908 to go to Manchuria, China, as Livestock Expert for the Manchuria Government. In 1910 he returned to the United States to take charge of the Livestock Extension work at the University of Minnesota. In the summer of 1912 he was appointed Professor of Animal Husbandry at the Pennsylvania State College which position he now holds.

**R. J. WELD** was born in Warren county, Pa., October 27, 1868 upon the farm whch he now owns and operates. He is of Scotch-American parentage. His education was secured at the common schools and at the Sugar Grove Seminary, also at a business college. He received his agricultural education and training at the Pennsylvania State College and Experiment Station. He is actively engaged in dairy farming and endeavoring through breeding, weeding and feeding to build up a large herd. He keeps accurate records of the production of his cows, and is building up his farm through systematic cultivation and fertilization.

**W. THEO. WITTMAN** was born and raised on a farm in Lehigh county. As a small boy he was particularly interested in poultry and fruit growing and has always since retained a strong interest in both these branches of agriculture, constantly studying and working with both. He is now Poultry Judge with a National reputation, and his name is constantly appearing in the better class of poultry journals as a contributor to the poultry knowledge of the day. He has written several books on poultry keeping that are largely advertised and have commanded a big sale. As Superintendent of the Poultry Department of the Great Allentown Fair he has built up there one of the very finest and best displays of pure breed poultry to be seen anywhere in this country, greatly stimulating the interest in better poultry among farmers and others throughout eastern Pennsylvania and thereby enhancing the market value of their poultry and poultry products enormously.

**D. H. WATTS** was born near Kerrmoor, Pa., May 25, 1861; was raised on the farm of his father, Martin Watts, and educated in the public schools, which schooling was supplemented by a few months attendance at the Indiana State Normal School. He always has been interested in farmer's organizations and served two years as President of the Clearfield County Agricultural Society. He located upon his farm in 1866 and erected thereon modern buildings and established a dairy plant, where fine butter for a special trade is produced. The growing of fruits is also a specialty. On his farm known as "Orchard View Farm," there are 3,000 apple, peach, pear and plum trees, all his own selection and planting.

**JOHN W. WHITE** was born in Greenville, North Carolina, 1883. He received his elementary training in the public schools of that city and graduated from Bethel High School in 1899. Entered North Carolina Agricultural and Mechanical College and graduated in 1903. He spent the first three years after graduation in Chemical research and was appointed Assistant Chemist, Pennsylvania Experiment in 1906. In 1911 he obtained leave of absence and entered University of Illinois graduate school obtaining the degree of Master of Science in Agriculture in 1912. He was appointed Soils Research Chemist and Associate in Agronomy at the Pennsylvania State College in July, 1912, in which capacity he is still serving.

**E. L. WORTHEN** was born and reared on a farm in Illinois. He graduated at the University of Illinois in 1904. He was connected with the Illinois College and Station until 1906. From 1906 to 1909 he was Scientific Assistant in the National Bureau of Soils then in charge of "Soil Investigations," North Carolina Department of Agriculture until January, 1913, when he came to the Pennsylvania State College and Station as Assistant Professor of Agronomy. He has spent one year in graduate study at the Cornell University and received the degree of Master of Science in Agriculture in 1908. His present work consists of the teaching and investigation in Soils and Fertilizers.

**DAVID F. WARNER, JR.**, was born at Bridgeton, Rhode Island, in the year 1884. Early life was spent on his father's farm near the village of Bridgeton. He attended public schools in the town of Burnilville until the age of twelve when he left school to help on his father's farm. He continued farming until the age of 20, when he entered the Preparatory School of the Rhode Island State College. After completing the preparatory course he entered the Four Year Agricultural Course, graduating in June, 1912 with a degree of B. S. On June 1, 1913, he was appointed to the position of Assistant in Poultry Husbandry at the Pennsylvania State College which place he now holds.

**W. R. WHITE** was born on a farm near Grove City, Mercer county, Pennsylvania. He graduated from the Classical Course in Geneva College, in 1901. He taught school one year, was in the Civil Engineering Department of the Pittsburg and Lake Erie Railroad three years, and graduated from Pennsylvania State College in 1907. He was Assistant in Correspondence Courses, Pennsylvania State College from 1907 to 1908 and was Farm Superintendent near Pittsburg from 1908 to 1911. Since 1911 he has been Instructor in Agricultural Education, in the Pennsylvania State College, State College, Pennsylvania.

Directions: County Chairmen and Local Institute Committees will please use the following outline for heading of program and follow as far as practicable the classification of subjects, embracing no more than two distinct topics for one session. The address of Welcome and Response can be omitted and a brief introductory by the County Chairman substituted when Local Committee deem advisable.

**SAMPLE PROGRAM** This Sample is Designed as an Aid to Institute Managers in Making up Their Programs.

## PROGRAM

OF THE

..............................................................COUNTY.

# FARMERS' INSTITUTES

TO BE HELD UNDER THE AUSPICES OF

## DEPARTMENT OF AGRICULTURE
## OF PENNSYLVANIA

## DIVISION OF FARMERS' INSTITUTES.

IN..............................................................HALL

..............................................................PA.

**FRIDAY AND SATURDAY, DEC. 5 AND 6, 1912**

EXERCISES PUBLIC AND FREE—EVERYBODY IS INVITED.

# ORDER OF BUSINESS

## OPENING SESSION

### Devoted to Soil Conditions

Wednesday Afternoon, December 3, 1:30.

Presiding Officer, ................

Opening Exercises.

Soil Fertility.

Soil Cultivation.

How to Converse Soil Moisture.

(Question Box.)

Adjournment.

## EDUCATIONAL SESSION.

Wednesday Evening, December 3, 7:00.

Nature Study for County Schools.

Essential Qualifications to Successful Teaching.

Attractive Country School Grounds.

The Central Township School.

Adjournment.

## DAIRY, STOCK AND POULTRY SESSION

Thursday Morning, December 4, 9:00.

(Question Box.)

Feed for the Dairy Cow.

The Silo As An Economic Investment in the Dairy.

Poultry Breeding and Feeding for Profit.

Adjournment.

Thursday Afternoon, December 4, 1:30.

(Question Box.)

Good Country Roads; How Obtained.

Sheep Husbandry.

Legumes for Feed and Fertility.

Adjournment.

## LADIES' SESSION

In the Interest of Country Homes.

Thursday Evening, December 4, 7:00.

Music.

A Model Home.

What Books and Magazines Shall We Read; The Quality and Preparation of Food.

Heating, Lighting, Ventilating and Sanitary Arrangement of Country Homes.

Lawn and Garden.

Social Life in Rural Districts.

Adjournment.

## SPECIAL NOTICE

The foregoing order will be followed as closely as possible, but other exercises will be introduced, if found desirable.

Although these institutes are designed and conducted for the education and advantage of farmers, yet all who are interested are invited to attend, and it is hoped that they will show their appreciation, not only by being present at the meetings, but also by taking part in the discussions.

## ASK QUESTIONS

A question box will be kept upon the secretary's desk, and all are invited to place therein such questions as they may wish to have discussed during the session. At the proper time, designated by the meeting, these questions will be referred to some one for answer, or brought up for general discussion.

All granges, alliances, agricultural societies and kindred agricultural organizations are specially invited to attend.

For further information, and for programs, address,

Name, ....................

Address, ............

Chairman of the Board of Institute Managers for ————County.

| Local Committee. | Committee on Question. | County Board of Managers. |
|---|---|---|
| Wm. Stevens<br>Address ..................<br>Mrs. Jane Wefly,<br>Address ..................<br>Miss Emma Stone,<br>Address .................. | William Stover,<br>Address, ................<br>Miss Jane Miller,<br>Address, ................ | J. A. Walker,<br>Address, ...............<br>Wm. Cedars,<br>Address, ...............<br>John Williams,<br>Address, ............... |

## MEANS OF ACCESS

Trains on the B. C. R. R. arrive from the East at 8:30 A. M. and 5:19 P. M.; from the West at 9:40 A. M. and 9:38 P. M.

On the P. R. R. trains from the East arrive at 4:52 and 9:54 A. M. and 4:32 P. M.; from the West at 10:18 A. M. and 5:08 and 9:23 P. M.

# CALENDAR, 1914.

## JANUARY.

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## AUGUST.

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## SEPTEMBER.

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## OCTOBER.

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## NOVEMBER.

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## DECEMBER.

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| 27 | 28 | 29 | 30 | 31 | .. | .. |

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

BULLETIN No. 244

# TABULATED ANALYSES OF
# Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE
WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

From August 1 to December 31, 1913

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

## OATH OF FERTILIZER SAMPLING AGENT.

---

Commonwealth of Pennsylvania, ss:

Personally appeared before me, .................................... of ....................County of .................... and State of Pennsylvania, who being duly sworn, according to law, doth depose and say: That he has been duly appointed an agent of the Department of Agriculture of Pennsylvania to collect samples of Commercial Fertilizers for analysis, that he is not in any way interested in the manufacture or sale of any fertilizer, and that he will perform the duties of the office with fidelity in accordance with the requirements of law to the best of his ability, and as set forth in the instructions issued by the Secretary of the Department of Agriculture governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this
.................. day of ..........
A. D. ..............................
..................................
(Signed), ...............

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

BULLETIN No. 244

TABULATED ANALYSES OF

# Commercial Fertilizers

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1914

HARVARD COLLEGE LIBRARY
MAR 18 1914
CAMBRIDGE, MASS.

Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE.
COMMONWEALTH OF PENNSYLVANIA.

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# The Act of 1st May 1909, Commonly Referred to as "The New Fertilizer Law" is as Follows:

## No. 205.

## AN ACT

To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand or trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year: and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more than one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of

business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

## No. 95.

## AN ACT

**Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.**

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

# LETTER OF TRANSMITTAL.

State College, Pa., December 22, 1913.

Hon. N. B. Critchfield, *Secretary of Agriculture, Harrisburg, Pa.:*

Dear Sir: I have the honor to transmit herewith my report upon the analysis of the samples of commercial fertilizers received from the official sampling agents during the fall season of 1913.

Very respectfully,

WM. FREAR.

# FERTILIZER ANALYSES AUGUST 1 TO DECEMBER 31, 1913.

Since August 1, 1913, there have been received from authorized sampling agents twelve hundred and seventy-four fertilizer samples, of which five hundred and forty were subjected to analysis. Preference is given to those which have not been recently analyzed. In cases where two or more samples representing the same brand were received, equal portions from several samples were united, and the composite sample was subjected to analysis.

The samples analyzed group themselves as follows: 292 complete fertilizers, furnishing phosphoric acid, potash and nitrogen; 6 dissolved bones, furnishing phosphoric acid and nitrogen; 140 rock and potash fertilizers, furnishing phosphoric acid and potash; 40 acidulated rock phosphates, furnishing phosphoric acid only; 36 ground bones, furnishing phosphoric acid and nitrogen, and 26 miscellaneous samples, which group includes substances not properly classified under the foregoing heads.

The determinations to which a complete fertilizer is subjected are as follows: (1) Moisture, useful for the comparison of analyses, for indication of dry condition and fitness for drilling, and also of the conditions under which the fertilizer was kept in the warehouse. (2) Phosphoric acid—total and insoluble; that is, that portion not soluble in water nor in warm ammonium citrate solution (a solution supposed to represent the action of plant roots upon the fertilizer), which is assumed to have little immediate food value. By difference, it is easy to compute the so-called "available" phosphoric acid. (3) Potash soluble in water—most of that present in green sand marl and crushed minerals, and even some of that present in vegetable materials such as cotton-seed meal, not being included because insoluble in water even after long boiling. (4) Nitrogen—This element is determined by a method which simply accounts for all present, without distinguishing between the quantities present in the several forms of ammonium salts, nitrates or organic matter. (5) Chlorin—this determination is made to afford a basis for estimating the proportion of the potash that is present as chlorid or muriate, the cheaper source. The computation is made on the assumption that the chlorin present, unless in excess, has been introduced in the form of muriate of potash; but doubtless there are occasional exceptions to this rule. One part of chlorin combines with 1.326 parts of potash to form the pure muriate; knowing the chlorin, it is, therefore, easy to compute the potash equivalent thereto. (7) In the case of ground bone, the state of sub-division is determined by sifting through accurately made sieves; the cost of preparation and especially the promptness of action of bone in the soil depend very largely on the fineness of its particles, the finer being much more quickly useful to the plant.

The preceding paragraph sets forth the nature of the examinations given to the several classes of fertilizers under the laws in force prior to 1909. The legislation of 1909 has made needful, however, some additional tests. Sec. 4, of the Act of May 1, 1909, prohibits the sale of "pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact." All nitrogenous fertilizers have, therefore, been submitted to a careful microscopic examination, at the time of preparing the sample for analysis, to detect the presence of the tissues characteristic of the several materials above named. The act of April 23, 1909, makes it unlawful to use the word "bone" in connection with, or as part of the name of any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone. All fertilizers in whose name the word "bone" appears, were therefore examined by microscopic and chemical methods to determine, so far as possible with present knowledge, the nature of the ingredient or ingredients supplying the phosphoric acid. It is a fact, however, well known to fertilizer manufacturers and which should be equally understood by the consumer, that it is, in certain cases, practically impossible to determine the source of the phosphoric acid by an examination of the finished fertilizer. The microscope shows clearly the structure of raw bone, but does not make it possible to discriminate between thoroughly acidulated bone and acidulated rock. The ratio of nitrogen to phosphoric acid in a raw bone—and only such bone as has not been deprived of any considerable proportion of its nitrogenous material by some manufacturing process can properly be called "pure animal bone"—is about 1:8; in cases where the ratio of nitrogen to phosphoric acid exceeds 8, it is clear that part, at least, of the phosphoric acid has been supplied by something else than pure animal bone; but, inasmuch as nitrogen may have been introduced in some material other than bone and no longer detectible by the microscope, the presence of nitrogen and phosphoric acid in the proportions corresponding to those of bone is not proof positive that they have been supplied by bone. Finally, the differences in the iron and silica content of bone and rock respectively, afford means of distinction useful in some cases; the usefulness of this distinction is limited, however, by the facts that kitchen bone frequently contains earthy impurities rich in iron and silica, and that earthy fillers can legally be used in fertilizers and are in fact considerably used therein both as "make-weights" and as "conditioners," or materials introduced to improve the drilling qualities of the goods. The fact that the phosphoric acid in bone and rock are identical in character is probably so well known as to require no detailed consideration in this connection.

The law having required the manufacturer to guarantee the amount of certain valuable ingredients present in any brand he may put upon the market, chemical analysis is employed to verify the guaranties stamped upon the fertilizer sacks. It has, therefore, been deemed desirable in this report to enter the guaranty filed by the manufacturer in the office of the Secretary of Agriculture, in such connection with the analytical results that the two may be compared. An unfortunate practice has grown up among manufacturers of so wording the guaranty that it seems to declare the presence in the goods of an amount of valuable constituent ranging from a certain minimum to a much higher maximum; thus, "Potash, 2 to 4 per cent." is a guaranty not infrequently given. In reality, the sole guaranty is for 2 per cent. The guaranteed amounts given for each brand in the following tables, are copied from the guaranties filed by the maker of the goods with the Secretary of Agriculture, the lowest figure given for any constituent being considered to be the amount guaranteed. For compactness and because no essentially important fact is suppressed thereby, the guaranties for soluble and reverted phosphoric acid have not been given separately, but are combined into a single guaranty for available phosphoric acid; in cases where the maker's guaranty does not specifically mention available phosphoric acid, the sum of the lowest figures given by him for soluble and reverted phosphoric acid is used. The law of 1879 allowed the maker to express his guaranty for nitrogen either in terms of that element or in terms of the ammonia equivalent thereto; since ammonia is composed of three parts of hydrogen and fourteen parts of nitrogen, it is a very simple matter to calculate the amount of one, when the amount of the other is given; the amount of nitrogen multiplied by 1.214 will give the corresponding amount of ammonia, and the amount of ammonia multiplied by 0.824 will give the corresponding amount of nitrogen. In these tables, the expression is in terms of nitrogen. The laws of 1901 and 1909 abolished the alternative and required that the quantity shall be given in terms of nitrogen.

The system of valuation employed and the schedules of values are fully set forth in Bulletin No. 242, to which the reader is referred for information upon these subjects.

Many manufacturers, after complying with the terms of the law, insert additional items in their guaranties, often with the result of misleading or confusing the buyer; the latter will do well to give heed to those items only that are given as the law requires and that are presented in these tables:

A summary of the analyses made this season may be presented as follows:

### Summary of Analyses Made this Season.

| | Complete fertilizers. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Number of analyses, | 292 | 1.40 | 6 | 40 | 36 |
| Moisture, per cent., | 9.09 | 9.38 | 7.74 | 8.39 | 6.28 |
| Phosphoric acid: | | | | | |
| Total, per cent., | 9.86 | 10.95 | 15.00 | 15.39 | 23.84 |
| Available, per cent., | 8.06 | 9.90 | 10.23 | 14.08 | .......... |
| Insoluble, per cent., | 1.80 | 1.05 | 4.77 | 1.31 | .......... |
| Potash, per cent., | 4.28 | 4.70 | .......... | .......... | .......... |
| Nitrogen, per cent., | 1.47 | .......... | 1.99 | .......... | 3.12 |
| Mechanical analyses of bone: | | | | | |
| Fine, | .......... | .......... | .......... | .......... | 56.00 |
| Coarse, | .......... | .......... | .......... | .......... | 44.00 |
| Commercial valuation,* | 24.36 | 16.85 | 24.26 | 13.70 | 32.63 |
| Average selling price,* | 21.92 | 16.25 | 24.75 | 13.51 | 31.12 |

*Dollars per ton.

For the purpose of indicating more specifically to the eye, cases deficient from guaranty, an asterisk has been affixed in the analytical tables where the ingredient has been found less in quantity than the manufacturer guaranteed. Too great emphasis should not be placed upon very slight deficiencies, because very slight imperfections in mixing and slight variation in analysis are practically unavoidable. The asterisk has been used, therefore, only in cases where the deficiencies amount to 0.2 per cent. or more, except where nitrogen has been guaranteed in amounts no higher than 1.0 per cent., in which case an asterisk has been affixed where the deficiency amounts to 0.1 per cent. or more.

The cases of departure of goods from their guaranteed composition observed this season, including only those cases in which an asterisk has been affixed, were as follows:

## Summary of Instances of Deficiency from Guaranty.

| | Complete fertilizers. | Rock and potash. | Dissolved bone. | Dissolved rock. | Ground bone. |
|---|---|---|---|---|---|
| Deficient in four constituents, ................ | 0 | 0 | 0 | 0 | 0 |
| Deficient in three constituents, ................ | 3 | 3 | 0 | 0 | 0 |
| Deficient in two constituents, .................. | 32 | 20 | 2 | 3 | 1 |
| Deficient in one constituent, .................. | 70 | 40 | 2 | 6 | 7 |
| Total number of samples in which deficiencies occur, ........................................ | 105 | 63 | 4 | 9 | 8 |

The cases of deficiency noted during the past nine seasons in the composition of goods as compared with their guaranties, expressed in percentage of the total number of goods of each class analyzed, are as follows:

### Percentage of deficiency, 1909-1913.

| | Spring, 1909. | Fall, 1909. | Spring, 1910. | Fall, 1910. | Spring, 1911. | Fall, 1911. | Spring, 1912. | Spring, 1913. | Fall, 1913. |
|---|---|---|---|---|---|---|---|---|---|
| Complete fertilizers, ............... | 39.5 | 46.3 | 28.9 | 35.9 | 45.1 | 46.9 | 39.0 | 32.3 | 36.0 |
| Dissolved bone, ...................... | 25.0 | * | 37.5 | 25.0 | 16.6 | 100.00 | 50.0 | 50.0 | 66.7 |
| Rock and potash, .................... | 36.2 | 30.4 | 25.2 | 37.0 | 27.1 | 43.4 | 33.6 | 26.4 | 46.0 |
| Dissolved rock, ...................... | 33.3 | 19.5 | 4.3 | 6.3 | 5.9 | 11.9 | 12.5 | 20.9 | 22.5 |
| Ground bone, ......................... | 20.3 | 28.4 | 29.17 | 27.6 | 47.8 | 20.0 | 29.2 | 25.0 | 22.2 |
| All classes except miscellaneous,.. | 37.6 | 39.6 | 26.5 | 33.5 | 38.7 | 46.0 | 36.0 | 30.4 | 35.0 |

*Only two samples analyzed for which no guaranties are reported.

A comparison of the average composition of all samples of complete fertilizers for which guaranties are recorded with the average of the corresponding guaranties, for several seasons past, including those of this season, follows:

## Average Composition and Guaranty Compared.

| | Average composition. Per cent. | Average guaranty. Per cent. |
|---|---|---|
| **Spring, 1909.** | | |
| Phosphoric acid: | | |
| Total, | 9.83 | 8.98 |
| Available, | 8.07 | 7.66 |
| Potash, | 5.07 | 4.80 |
| Nitrogen, | 1.67 | 1.00 |
| **Fall, 1909.** | | |
| Phosphoric acid: | | |
| Total, | 10.13 | 9.34 |
| Available, | 8.27 | 8.08 |
| Potash, | 3.41 | 3.12 |
| Nitrogen, | 1.33 | 1.26 |
| **Spring, 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.80 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Fall, 1910.** | | |
| Phosphoric acid: | | |
| Total, | 9.72 | 8.80 |
| Available, | 8.26 | 7.62 |
| Potash, | 5.20 | 4.68 |
| Nitrogen, | 1.63 | 1.60 |
| **Spring, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.86 | 8.96 |
| Available, | 8.31 | 7.86 |
| Potash, | 4.97 | 4.65 |
| Nitrogen, | 1.53 | 1.54 |
| **Fall, 1911.** | | |
| Phosphoric acid: | | |
| Total, | 9.59 | 9.09 |
| Available, | 8.20 | 7.87 |
| Potash, | 3.63 | 3.39 |
| Nitrogen, | 1.12 | 1.19 |
| **Spring, 1912.** | | |
| Phosphoric acid: | | |
| Total, | 9.51 | 8.82 |
| Available, | 8.09 | 7.78 |
| Potash, | 5.34 | 5.05 |
| Nitrogen, | 1.56 | 1.53 |
| **Spring, 1913.** | | |
| Phosphoric acid: | | |
| Total, | 9.71 | 8.92 |
| Available, | 8.11 | 7.37 |
| Potash, | 5.41 | 5.17 |
| Nitrogen, | 1.61 | 1.62 |
| **Fall, 1913.** | | |
| Phosphoric acid: | | |
| Total, | 9.86 | 9.09 |
| Available, | 8.06 | 7.83 |
| Potash, | 4.28 | 4.27 |
| Nitrogen, | 1.47 | 1.35 |

It is of interest to note how closely the series of valuations based upon the wholesale price of raw materials in the principal markets during the most important buying season and upon certain average allowances for expenses and profits on the part of the mixer and jobber, coincides with the retail prices later ascertained. A comparison for several seasons past is given below:

### Comparison of Selling Price and Valuation, 1909-1913.

| | Selling price. | Valuation. | Excess of valuation over selling price. |
|---|---|---|---|
| Complete fertilizers: | | | |
| 1909, Spring, | 24.88 | 25.31 | .43 |
| Fall, | 22.07 | 22.25 | .14 |
| 1910, Spring, | 25.26 | 26.63 | 1.43 |
| Fall, | 21.76 | 22.24 | .48 |
| 1911, Spring, | 24.97 | 25.95 | .98 |
| Fall, | 21.72 | 22.33 | .61 |
| 1912, Spring, | 27.64 | 27.24 | —.40 |
| 1913, Spring, | 25.08 | 26.44 | 1.36 |
| Fall, | 21.92 | 24.36 | 2.44 |
| Dissolved bone: | | | |
| 1909, Spring, | 22.25 | 21.57 | —.68 |
| Fall, | 24.50 | 22.85 | —1.65 |
| 1910, Spring, | 22.17 | 21.47 | —.70 |
| Fall, | 25.80 | 25.70 | —.10 |
| 1911, Spring, | 20.33 | 23.82 | 3.49 |
| Fall, | 24.88 | 21.51 | —3.37 |
| 1912, Spring, | 20.94 | 18.92 | 2.82 |
| 1913, Spring, | 18.55 | 21.63 | 3.05 |
| Fall, | 24.75 | 24.26 | —.49 |
| Rock and potash: | | | |
| 1909, Spring, | 16.98 | 15.94 | 1.04 |
| Fall, | 16.10 | 15.50 | —.60 |
| 1910, Spring, | 17.16 | 16.08 | —1.08 |
| Fall, | 16.38 | 16.34 | —.04 |
| 1911, Spring, | 17.65 | 15.99 | —1.66 |
| Fall, | 16.25 | 16.07 | —.18 |
| 1912, Spring, | 18.17 | 16.26 | —1.91 |
| 1913, Spring, | 16.75 | 16.52 | —.23 |
| Fall, | 16.25 | 16.85 | .60 |
| Dissolved rock: | | | |
| 1909, Spring, | 14.76 | 13.62 | —1.14 |
| Fall, | 13.86 | 14.02 | .16 |
| 1910, Spring, | 14.56 | 14.00 | —.56 |
| Fall, | 14.01 | 14.15 | .14 |
| 1911, Spring, | 15.83 | 14.26 | —1.58 |
| Fall. | 14.00 | 13.78 | .22 |
| 1912, Spring, | 14.69 | 14.20 | —.49 |
| 1913, Spring, | 13.96 | 14.25 | .29 |
| Fall, | 13.51 | 13.70 | .19 |
| Ground bone: | | | |
| 1909, Spring, | 30.70 | 30.28 | —.42 |
| Fall, | 29.39 | 28.71 | —.68 |
| 1910, Spring, | 30.19 | 30.27 | .08 |
| Fall, | 29.98 | 31.10 | 1.12 |
| 1911, Spring, | 30.93 | 31.47 | .54 |
| Fall, | 31.17 | 31.18 | .01 |
| 1912, Spring, | 32.81 | 33.26 | .45 |
| 1913, Spring, | 33.86 | 32.50 | —1.36 |
| Fall, | 31.12 | 32.63 | 1.51 |

## MATERIALS USED IN FERTILIZERS.

The microscopic examination of the nitrogenous fertilizers for leather, hair, and other materials the use of which without notice is prohibited by the Act of May 1, 1909, revealed in no case such quantity of any of these substances as might not fairly be regarded as an accidental trace. No instance has been reported by the sampling agents in which a declaration of the presence of such material has been made. It is, however, a matter of quite general knowledge that substances of this kind are being largely used in fertilizer mixtures; but, in most cases at least, only after such treatment as results in the destruction of the characteristic tissues and, at the same time, wholly or partly in that of the organic compounds originally present.

In conformity with the requirements of the Act of April, 23, 1909, many firms dropped from the brand names of goods manufactured by them the word "bone" hitherto forming part of said names. Where such change in name appears, it may be taken as evidence that the phosphoric acid is derived, at least in part, from something else than bone.

## ORGANIZATION OF THE WORK.

In conclusion, I would state that the work of the season has been performed under my direction, as follows:

The nitrogen determination by W. Thomas, B. S.; those of total phosphoric acid by Fred J. Holben, B. S.; of insoluble phosphoric acid by H. D. Edmiston and F. N. Crawford, B. S.; of potash by E. S. Erb, M. S.; computations by Miss Verna Bryce, and chlorin, by Charles Kern; and the preparation of samples, care of records, and the detail of the compilation of this bulletin, by G. C. Given, M.S. To these trained and experienced assistants, my acknowledgments are due for loyal and efficient service.

# COMPLETE

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | ALLENTOWN BONE AND PHOSPHATE WORKS, ALLENTOWN, PA. | | |
| 2756 | Complete Phosphate, | Geo. Balliett, Sweitzer, | 11.08 |
| 2755 | Special $25.00 Phosphate, | Geo. Balliett, Sweitzer, | 18.23 |
| | AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK. | | |
| 3305 | †Dead Shot Phosphate, | Levi Berkley, Somerset, | 9.08 |
| 2536 | | N. R. Yost, Myerstown, | |
| 3428 | | Mowrey Latshaw Hardware Co., Spring City, | |
| 2390 | Grass and Lawn Top Dresser, | Athens Milling & Produce Co., Athens. | 11.08 |
| 2771 | †Lion Crop Grower, | Harry Keefer, Pine Grove, | 10.70 |
| 3053 | | Paxton Flour & Feed Co., Bowmansdale. | |
| 2785 | †Peerless Vegetable and Grain Grower, | Lewis F. Mosser, Moserville, | 9.42 |
| 2780 | | C. E. Starr, Three Springs, | |
| 2918 | | Zinn Bros., York, | |
| 2858 | †Ten Percent. Potash Mixture for Potatoes. | W. I. Liester, McAllisterville, | 7.93 |
| 3408 | | C. R. Rosenberger, Colmar, | |
| 3399 | Allen's Popular Phosphate, | Tobias Gayman, Plumsteadville, | 10.53 |
| 2925 | Allen's Special for Wheat and Grass, | H. W. Burg, East Prospect, | 10.00 |
| 2476 | Bradley's Retriever Manure, | W. S. Laubach, Benton, | 9.43 |
| 3477 | Crocker's New Rival Fertilizer, | Geo. W. Crowl, Quarryville, R. D. No. 3. | 13.00 |
| 3145 | †Detrich's Imperial Compound, | B. F. Shannon & Co., Butler, | 10.65 |
| 2267 | | T. E. Comfort, Bermudian, | |
| 3306 | | Levi Berkeley, Somerset, | |
| 3008 | †Deitrich's Kangaroo Komplete Kompound, | Eli Yost, McEwensville, | 9.70 |
| 2939 | | Geo. B. Murphy, Red Lion, | |
| 3142 | | Enos. Berkey, Evens City, | |
| 3009 | †Deitrich's Standard Potash Fertilizer, | Eli Yost, McEwensville, | 8.40 |
| 3283 | | Wilson Hardware Co., Belle Vernon, | |
| 2675 | East India Garden and Farm Manure, | Theo. Gerhart, Gilbert, | 9.53 |
| 1799 | East India Hustler Phosphate, | A. W. Heller, Wapwallopen, | 9.00 |
| 2779 | East India Wheat and Hay Maker, | D. R. Stein, Orwigsburg, | 7.23 |
| 3398 | Great Eastern English Wheat Grower, | Julius Long, Danboro, | 11.08 |
| 3329 | Maryland Ammoniated Phosphate, | J. S. Sullenberger & Son, Fayetteville. | 11.75 |
| 2973 | Michigan Carbon Works, General Crop Fertilizer. | Elmer E. Carl, Coopersburg, | 11.30 |
| 2972 | Michigan Carbon Works' Homestead Fertilizer. | Biebel Bros., Kearsarge, | 11.30 |
| 2628 | Milsom's Buffalo Guano, | Percy Harman, Mt. Holly Springs, | 10.93 |
| 3147 | †Milsom's Erie King Fertilizer, | McKissick & Lutz, Euclid, | 11.23 |
| 3263 | | Frank Williams, Easton, | |
| 2790 | Milsom's Harrow Brand Phosphate, | J. H. Reed, Cressona, R. D., | 9.55 |
| 2791 | †Milsom's Soil Enricher, | John H. Reed, Cressona, R. D., | 10.93 |
| 2549 | | J. Y. Unberger, R. D., Lebanon, | |
| 3161 | | Emanuel Berkley, Rehresburg, | |
| 3430 | †Moro-Phillips Farmers' Phosphate, | I. J. Tustin, Phoenixville, | 10.08 |
| 2618 | | Israel Failor, Newville, R. No. 5, | |
| 3448 | | S. H. Dunkel, Myerstown, | |
| 3184 | | Nathan Hunsicker, Snyders, | |
| 2617 | †Moro-Phillips Pure Phuine, | Lowery Smith, Newville, R. No. 2, | 11.08 |
| 3429 | | I. J. Tustin, Phoenixville, | |
| 2475 | †North Western Complete Compound, | H. F. Rittenhouse, Berwick, | 11.60 |
| 2537 | | N. R. Yost, Myerstown, | |
| 2538 | North Western High Grade General Fertilizer. | N. R. Yost, Myerstown, | 10.08 |
| 2474 | North Western Pride of the North, | H. F. Rittenhouse, Berwick, R. No. 3. | 6.70 |
| 3296 | North Western Soluble Fertilizer, | N. B. Lemaraux, Lehman, | 8.95 |
| 2354 | †Packers' Union American Wheat and Rye Grower. | H. N. Dilling, Martinsburg, | 11.08 |
| 2579 | | A. D. Reber, Strausstown, | |
| 2394 | Read's Corn, Wheat and Rye, | Billing Keldar, New Albany, | 9.70 |
| 2333 | †Read's Standard Superphosphate, | W. V. Shirk, Oakland Mills, | 10.65 |
| 3167 | | Amos Pennypacker, Bally, | |

†Composite sample.

# FERTILIZERS.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 6.96 | 6.00 | 3.30 | 10.26 | 10.00 | 3.60 | .46 | 4.06 | 4.00 | 1.63 | 1.50 | 24.84 | ........ | 2756 |
| 6.89 | 6.00 | .61 | *7.50 | 8.00 | 3.40 | ...... | *3.40 | 4.00 | 1.36 | .75 | 21.36 | ........ | 2755 |
| 8.25 | 8.00 | 1.25 | 9.50 | 9.00 | 2.51 | ...... | 2.51 | 2.00 | .61 | .41 | 18.70 | 17.00<br>17.50<br>19.00 | 3305<br>2586<br>3428 |
| 5.99 | 5.00 | 1.72 | 7.71 | 6.00 | 2.65 | ...... | 2.65 | 2.00 | 3.76 | 3.91 | 31.14 | 38.00 | 2390 |
| 9.28 | 8.00 | .31 | 9.59 | 9.00 | 5.70 | ...... | *5.70 | 6.00 | 1.75 | 1.65 | 27.84 | 25.00<br>26.00 | 2771<br>3058 |
| 8.08 | 8.00 | 1.42 | 9.50 | 9.00 | 5.49 | ...... | 5.49 | 5.00 | 1.69 | 1.65 | 26.71 | 21.00<br>21.00<br>22.00 | 2785<br>2730<br>2918 |
| 5.54 | 5.00 | .96 | 6.50 | 6.00 | 10.05 | ...... | 10.05 | 10.00 | 1.74 | 1.65 | 28.75 | ......<br>30.00 | 2858<br>3403 |
| 7.96 | 8.00 | 2.01 | 9.97 | 9.00 | 2.00 | ...... | 2.00 | 2.00 | 1.06 | .82 | 20.30 | 22.00 | 3399 |
| 7.05 | 7.00 | 1.20 | 8.25 | 8.00 | 1.13 | ...... | 1.13 | 1.00 | .96 | .82 | 17.67 | 17.00 | 2925 |
| 6.79 | 6.00 | 2.34 | 9.13 | 7.00 | 5.33 | .91 | 6.24 | 5.00 | 3.03 | 2.47 | 32.97 | 27.00 | 2476 |
| *7.43 | 9.00 | 1.56 | *8.99 | 10.00 | 2.20 | ...... | 2.20 | 2.00 | 1.22 | 1.23 | 20.46 | 19.00 | 3477 |
| 7.81 | 8.00 | 1.59 | 9.40 | 9.00 | 2.59 | ...... | 2.59 | 2.00 | .90 | .82 | 19.88 | 20.00<br>17.00<br>19.00 | 3145<br>2267<br>3308 |
| *6.78 | 8.00 | 1.75 | *8.53 | 9.00 | 3.26 | ...... | 3.26 | 3.00 | 1.71 | 1.65 | 23.04 | 21.50<br>20.00<br>24.00 | 3008<br>2989<br>3142 |
| 6.00 | 6.00 | 1.59 | 7.59 | 7.00 | 5.45 | ...... | 5.45 | 5.00 | 1.32 | 1.23 | 22.77 | 20.50<br>26.00 | 3009<br>3283 |
| 8.06 | 8.00 | 1.64 | 9.70 | 9.00 | 7.36 | ...... | 7.36 | 7.00 | 3.45 | 3.29 | 36.67 | 36.00 | 2675 |
| 9.37 | 9.00 | 1.33 | 10.70 | 10.00 | 3.36 | ...... | 3.36 | 3.00 | .92 | .82 | 22.14 | 21.00 | 1779 |
| *8.73 | 10.00 | 3.80 | 12.53 | 11.00 | 6.13 | 3.42 | *9.55 | 10.00 | 2.24 | 1.65 | 35.97 | 30.00 | 2779 |
| 8.11 | 8.00 | 2.00 | 10.11 | 9.00 | 2.12 | ...... | 2.12 | 2.00 | 1.01 | .82 | 20.34 | 18.25 | 3398 |
| 8.29 | 8.00 | 1.49 | 9.78 | 9.00 | 3.21 | ...... | 3.21 | 3.00 | 1.91 | 1.65 | 25.52 | 21.00 | 3329 |
| 8.12 | 8.00 | 1.76 | 9.88 | 9.00 | 4.08 | ...... | 4.08 | 4.00 | .96 | .82 | 22.08 | 20.00 | 2753 |
| 8.04 | 8.00 | 1.87 | 9.91 | 9.00 | 1.90 | ...... | 1.90 | 1.50 | 2.11 | 2.06 | 25.02 | 23.50 | 2972 |
| 8.74 | 8.00 | 1.31 | 10.05 | 9.00 | 3.98 | ...... | 3.98 | 4.00 | 1.05 | .82 | 22.82 | 19.00 | 2628 |
| 7.13 | 7.00 | 1.63 | 8.76 | 8.00 | 1.27 | ...... | 1.27 | 1.00 | .89 | .82 | 17.84 | 19.00<br>...... | 3147<br>3263 |
| 7.61 | 6.00 | 1.58 | 9.19 | 7.00 | 9.01 | ...... | *9.01 | 10.00 | *2.25 | 2.47 | 32.38 | ........ | 2790 |
| 8.06 | 8.00 | 1.84 | 9.90 | 9.00 | 4.93 | ...... | 4.93 | 4.00 | 1.69 | 1.65 | 26.34 | ......<br>22.50<br>...... | 2791<br>2549<br>3161 |
| 8.98 | 7.00 | 1.72 | 10.70 | 8.00 | 1.23 | ...... | 1.23 | 1.00 | .93 | .82 | 20.00 | 23.00<br>16.50<br>17.00 | 3430<br>2618<br>3448 |
| 8.05 | 8.00 | 1.77 | 9.82 | 9.00 | 3.39 | ...... | 3.39 | 3.00 | 1.74 | 1.65 | 24.90 | 22.00<br>21.50<br>26.00 | 3184<br>2617<br>3429 |
| 8.07 | 8.00 | 1.63 | 9.70 | 9.00 | 3.98 | ...... | 3.98 | 4.00 | 1.09 | .82 | 22.50 | 19.34<br>20.00 | 2475<br>2587 |
| 8.12 | 8.00 | 1.89 | 10.01 | 9.00 | 5.03 | ...... | 5.03 | 4.00 | 1.79 | 1.65 | 26.94 | 23.00 | 2588 |
| 5.56 | 5.00 | 1.48 | 7.04 | 6.00 | 8.70 | ...... | *8.70 | 10.00 | 1.65 | 1.65 | 27.21 | 25.00 | 2474 |
| 6.95 | 6.00 | 1.08 | 8.03 | 7.00 | 8.66 | 1.22 | 9.88 | 10.00 | 3.34 | 3.29 | 37.89 | 32.00 | 3295 |
| 8.14 | 8.00 | 1.53 | 9.67 | 9.00 | 2.14 | ...... | 2.14 | 2.00 | .87 | .82 | 19.51 | 17.50<br>...... | 2354<br>2579 |
| 7.88 | 8.00 | 1.65 | 9.53 | 9.00 | 4.25 | ...... | 4.25 | 4.00 | 2.02 | 1.65 | 26.71 | 25.00 | 2394 |
| 8.05 | 8.00 | 1.61 | 9.66 | 9.00 | 4.33 | ...... | 4.33 | 4.00 | .95 | .82 | 22.15 | ......<br>20.00 | 2838<br>3167 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK—Continued. | | |
| 2770 | Reese's Challenge Crop Grower, | Harry Keefer, Pine Grove, | 10.48 |
| 2921 | Reese's Harvest Queen, | Milton Newman, Dover, | 3.68 |
| 2503 | †Sharpless & Carpenter's Dissolved Fertilizer for Potatoes and General Use. | Albert Pennypacker, Glen Moore, | 10.23 |
| 2784 | | Lewis F. Mosser, Mosersville, | |
| 2856 | †Sharpless and Carpenter's Farmers' Brand Phosphate. | Jonathan Kisers, Thompsontown, | 10.13 |
| 2502 | | Albert Pennypacker, Glen Moore, | |
| 2978 | | Farmers' Supply Co., New Castle, | |
| 2783 | †Sharpless & Carpenter's No. 1 Brand Phosphate. | Lewis F. Mosser, Mosserville, | 10.15 |
| 3109 | | A. B. Shoemaker, Tullytown, | |
| 3410 | Sharpless and Carpenter's Soluble Tampico Guano. | A. B. Shoemaker, Tullytown, | 7.53 |
| 2528 | †Susquehanna XXV Phosphate, | A. H. Kelly & Son, Schwenksville, | 11.70 |
| 2429 | | J. N. Getz Co., Lock Haven, | |
| 2571 | | John H. Boyer, East Hanover, | |
| 3470 | Wheeler's Potato Manure, | Wm. Hunt, Elkland, | 11.68 |
| 3256 | †Wheeler's Royal Wheat Grower, | Jas. G. Horn, Scenery Hill, | 9.98 |
| 3151 | | Alfred Kahler, Bethlehem, R. No. 3, | |
| 3271 | | J. A. Gummo, Mill Hall, R. No. 1, | |
| 2671 | Williams & Clark's Prolific Fertilizer, | Milton Smith, Little Gap, | 8.83 |
| 2461 | Williams & Clark's Clark's Root Manure, | Zehner Bros., Bloomsburg, | 11.20 |
| 3282 | Zell's Little Treasure, | Chas. T. Wills & Co., Parnassus, | 9.75 |
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | | |
| 3366 | Ammoniated Crop Compound, | Abraham Thumma, Newville, R. No. 3. | 13.26 |
| 2534 | †American Excelsior Guano, | N. R. Yost, Myerstown, | 12.88 |
| 3354 | | J. D. Goldsmith, Williamson, | |
| 3013 | †American Fish and Bone Compound, | S. K. Chambers & Bro., Elkview, | 10.50 |
| 2533 | | N. R. Yost, Myerstown, | |
| 3367 | | Abraham Thumma, Newville, R. No. 3. | |
| 2269 | †American Prize Truck Guano, | J. W. Glatfelter, Rossville, | 8.88 |
| 3365 | | Abraham Thumma, Newville, R. D. 2. | |
| 3368 | Bob White Fertilizer for Wheat and Grass, | Abraham Thumma, Newville, R. No. 3. | 12.06 |
| | AMERICAN REDUCTION CO., PITTSBURGH, PA. | | |
| 2337 | †Common Sence, | Geo. H. Swearinger, Dunbar, | 6.65 |
| 2388 | | D. W. Bowman, Saltsburg, | |
| | ARMOUR FERTILIZER WORKS, BALTIMORE, MD. | | |
| 1892 | All Soluble, | McCalmot & Co., Bellefonte, | 6.28 |
| 1706 | Celery Special, | Jacob Keck Sons, Kress, | 5.30 |
| 2414 | †Fruit and Root Crop Special, | Grant Johnson, Millville, | 7.83 |
| 2384 | | A. M. Ashe, Kittanning, R. No. 2, | |
| 2550 | | M. L. Bachman, Lebanon, | |
| 2335 | Grain Grower, | W. F. Smith, Mount Pleasant, | 11.48 |
| 2306 | Superior, | M. J. Sheffer, Hanover, | 6.98 |
| | ATLANTIC FERTILIZER CO., BALTIMORE, MD. | | |
| 1676 | Crop Producer, | S. F. Peckman, Williamson, | 7.48 |
| 2374 | G. G. G. Golden Grain Grower, | D. Yingst, Hummelstown, | 8.58 |
| 1677 | Matchless A. B. C. Food, | S. F. Peckman, Williamson, | 4.65 |
| | R. S. AUCKER, SHAMOKIN, PA. | | |
| 3215 | Grade D. Bone Slaughterhouse Phosphate, | Geo. R. Hendricks & Son, Selinsgrove. | 7.38 |
| 3221 | High Grade Potash, Ammoniated Potato and Truck Phosphate. | R. S. Aucker, Shamokin, | 9.40 |

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†Composite sample.

LIZERS—Continued

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.22 | 8.00 | 1.72 | 9.94 | 9.00 | 2.62 | ...... | 2.62 | 2.00 | 1.20 | .82 | 21.75 | 19.00 | 2770 |
| 8.39 | 8.00 | 1.30 | 9.69 | 9.00 | 2.29 | ...... | 2.29 | 2.00 | 1.20 | 1.08 | 21.42 | 18.65 | 2921 |
| 8.17 | 8.00 | 2.22 | 10.39 | 9.00 | 4.68 | ...... | *4.68 | 6.00 | *1.85 | 2.06 | 27.06 | 30.00<br>25.50 | 2508<br>2784 |
| *7.78 | 8.00 | 1.77 | 9.55 | 9.00 | 4.15 | ...... | 4.15 | 4.00 | .99 | .82 | 21.99 | 20.00<br>22.00<br>24.00 | 2856<br>2502<br>2978 |
| 8.03 | 8.00 | 2.11 | 10.14 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.64 | 1.65 | 23.43 | 20.00<br>25.00 | 2783<br>3409 |
| 8.49 | 8.00 | 1.53 | 10.02 | 9.00 | 6.77 | ...... | *6.77 | 7.00 | 3.44 | 3.29 | 36.42 | 35.00 | 3410 |
| 8.09 | 8.00 | 1.62 | 9.71 | 9.00 | 1.41 | ...... | 1.41 | 1.00 | .81 | .82 | 18.51 | 20.00<br>21.50<br>...... | 2528<br>2429<br>2571 |
| 8.26 | 8.00 | 1.24 | 9.50 | 9.00 | 3.59 | ...... | 3.59 | 3.00 | 2.01 | 2.06 | 26.20 | 27.90 | 3470 |
| 7.90 | 8.00 | 1.85 | 9.75 | 9.00 | 2.37 | ...... | 2.37 | 2.00 | 1.04 | .82 | 20.54 | ......<br>22.00<br>17.00 | 3256<br>3151<br>3271 |
| 7.45 | 7.00 | 2.21 | 9.66 | 8.00 | 1.57 | ...... | 1.57 | 1.00 | 1.01 | .82 | 19.20 | 16.50 | 2671 |
| 9.18 | 9.00 | 2.04 | 11.22 | 10.00 | 6.86 | ...... | 6.86 | 7.00 | 1.03 | .82 | 26.52 | 24.00 | 2461 |
| *6.48 | 7.00 | 1.92 | 8.40 | 8.00 | 1.20 | ...... | 1.20 | 1.00 | 1.06 | .82 | 17.96 | 24.00 | 3282 |
| 7.86 | 8.00 | 3.10 | 10.96 | 9.00 | 2.00 | .57 | 2.57 | 2.00 | .90 | .82 | 20.73 | ........ | 3366 |
| 8.67 | 8.00 | 2.36 | 11.03 | 9.00 | 5.08 | ...... | 5.08 | 5.00 | 1.74 | 1.65 | 27.60 | 23.00<br>22.00 | 2584<br>3354 |
| 8.29 | 8.00 | 2.80 | 11.09 | 9.00 | 3.27 | ...... | 3.27 | 3.00 | 1.71 | 1.65 | 25.28 | 23.00<br>22.00<br>...... | 3013<br>2533<br>3367 |
| *7.77 | 8.00 | 2.27 | 10.04 | 9.00 | 7.20 | 2.84 | 10.04 | 10.00 | 1.76 | 1.65 | 32.85 | 26.00<br>...... | 2269<br>3365 |
| 9.61 | 9.00 | 1.91 | 11.52 | 10.00 | 2.26 | ...... | 2.26 | 2.00 | 1.18 | .82 | 22.87 | ........ | 3368 |
| 7.94 | 7.00 | 1.24 | 9.18 | 8.00 | 1.64 | ...... | 1.64 | 1.00 | 1.35 | 1.23 | 20.92 | 15.00<br>15.80 | 2337<br>2338 |
| *7.59 | 8.00 | 1.13 | 8.72 | 8.50 | 4.54 | ...... | 4.54 | 4.00 | *2.60 | 2.88 | 29.18 | 29.00 | 1892 |
| 7.18 | 7.00 | .94 | 8.12 | 8.00 | 14.79 | ...... | *14.79 | 15.00 | *2.22 | 2.47 | 37.30 | 33.00 | 1706 |
| *7.60 | 8.00 | 2.10 | 9.70 | 8.50 | 5.47 | ...... | 5.47 | 5.00 | 1.66 | 1.65 | 26.24 | 23.00<br>26.50<br>24.00 | 2414<br>2384<br>2550 |
| 8.25 | 8.00 | 1.78 | 10.03 | 8.50 | 2.37 | ...... | 2.37 | 2.00 | 1.61 | 1.65 | 23.87 | 25.00 | 2385 |
| *7.73 | 8.00 | 1.27 | 9.00 | 8.50 | 6.99 | ...... | 6.99 | 7.00 | .93 | .82 | 24.38 | 21.00 | 2303 |
| 7.31 | 8.00 | 1.17 | 8.98 | 9.00 | 2.35 | ...... | 2.35 | 2.00 | .56 | .41 | 17.86 | 15.50 | 1676 |
| *8.80 | 9.00 | .70 | *9.50 | 10.00 | 4.21 | ...... | 4.21 | 4.00 | 1.73 | 1.65 | 25.98 | 24.00 | 3374 |
| *7.39 | 8.00 | .79 | *8.18 | 9.00 | 3.16 | ...... | 3.16 | 3.00 | .41 | .41 | 15.06 | 16.00 | 1677 |
| 8.05 | 7.00 | 1.95 | 10.00 | 9.00 | 3.96 | ...... | 3.96 | 3.00 | 1.10 | .90 | 22.59 | 21.00 | 3215 |
| *7.57 | 8.00 | .47 | *8.04 | 9.00 | 4.44 | ...... | 4.44 | 4.00 | *.53 | 1.00 | 19.41 | ....... | 3221 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | BALTIMORE FERTILIZER CO., BALTIMORE, MD. | | |
| 3073 | †Old Honesty, | H. E. Van Ormer, Thompsontown, | 5.93 |
| 2287 | | O. H. Lightner, Gettysburg, | |
| 3339 | | Balto. Fertilizer Co., Chambersburg, | |
| | BALTIMORE PULVERIZING CO., BALTIMORE, MD. | | |
| 2601 | †Excelsior Compound, | John A. Henshew, Shippensburg, R. No. 5, | 11.75 |
| 3336 | | J. D. Gochenour, Dillsburg, | |
| 2598 | †Practical Fertilizer, | John A. Henshew, Shippensburg, R. No. 5. | 5.33 |
| 2598 | | J. D. Gochenour, Dillsburg, | |
| 3919 | General Crop Grower, | | 6.75 |
| 3488 | Giant Crop Grower, | E. B. Frits & Son, Quarryville, | 5.13 |
| 3508 | Harvest Queen, | C. F. Wilhelm, Holtz, R. D. No. 1, | 9.43 |
| 3386 | †High Grade Wheat Compound, | H. M. Frantz, Freystown, | 7.23 |
| 2254 | | L. E. Speck, Wellsville, | |
| 3511 | | J. H. Myers, Curley Hill, | |
| 2255 | Penniman's Special Guano No. 1, | L. E. Speck, Wellsville, | 6.20 |
| 3487 | Walt's X. X. Flesh and Bone Phosphate, | E. B. Fritz & Sons, Quarryville, | 5.63 |
| 3489 | †Wheat and Grass Compound, | E. B. Fritz & Sons, Quarryville, | 7.97 |
| 2600 | | John A. Henshew, Shippensburg, | |
| 3508 | | Jos. S. Risser, Elizabethtown, | |
| | BAUGH & SONS CO., PHILADELPHIA. | | |
| 2501 | †Baugh's Commercial Super Phosphate for General Use. | Baugh & Sons Co., Lyndell, | 8.03 |
| 2471 | | Clarence W. Aten, Nescopec, R. No. 2. | |
| 2557 | | J. S. Romberger, Elizabethville, | |
| 2470 | †Baugh's Double Eagle Twenty-Five Dollar Phosphate. | Clarence W. Aten, Nescopec, R. No. 2. | 8.55 |
| 2292 | | H. D. and J. F. Bream, Gettysburg, | |
| 2485 | | L. P. and R. W. Good, West Grove, | |
| 2573 | †Baugh's Energetic Super Phosphate, | A. G. Houtz, Myerstown, R. No. 1, | 8.55 |
| 2472 | | Clarence W. Aten, Nescopec, R. No. 2. | |
| 2847 | | Wisehaupt & Frazier, Port Royal, | |
| | †Baugh's Pure Bone and Muriate Potash Mixture. | Jas. Brockerhoff, Bellefonte, | 6.05 |
| 2821 | | | |
| 3296 | | Stanley H. Brown, Dallas, R. D., | |
| | HENRY V. BAXTER, CHESTER, PA. | | |
| 3406 | I. X. L. Phosphate, | Henry V. Baxter, Chester, | 6.40 |
| | BERG COMPANY, THE, PHILADELPHIA, PA. | | |
| 2655 | Berg's Uneedit Brand, | Lovine Lerch, Bethlehem, R. D., | 8.13 |
| 3032 | Berg's Vigor Volo Bone and Potash, | E. J. Milnor, Hatboro, | 10.06 |
| | BERGER BROTHERS, EASTON, PA. | | |
| 2649 | Lehigh Super Phosphate, | Christian Cressman, Richmond, | 17.50 |
| 2647 | Potato and Truck Special Phosphate, | Christian Cressman, Richmond, | 13.98 |
| | BOWKER FERTILIZER CO., NEW YORK. | | |
| 2957 | Bowker's Complete Compound, | H. W. Rehmeyer, Turnpike, | 9.63 |
| 2405 | †Bowker's Hill and Drill Phosphate, | Mills Bros., Carbondale, | 12.18 |
| 2426 | | J. A. Kimbel, Elysburg, | |
| 2568 | †Bowker's Six Percent. Potato Fertilizer, | S. A. Fishburn, Penbrook, R. D., | 9.58 |
| 2539 | | J. H. Hibschman, Myerstown, R. D., | |
| 3182 | | Alvin Frits, Barnesville, | |
| 2499 | Bowker's Sure Crop Phosphate, | H. L. Moses, Chester Springs, | 10.93 |
| 2409 | Stockbridge's Special Complete Manure for Potatoes and Vegetables. | A. Bolt, Great Bend, | 10.80 |
| | ELIAS S. BRUBACHER, RICHLAND, PA. | | |
| 3339 | Brubacher's Wheat and Grass Special Phosphate. | Elias S. Brubacher, Richland, | 5.78 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| *7.77 | 8.00 | 1.35 | 9.12 | 9.00 | 2.69 | ...... | 2.69 | 2.00 | .72 | .40 | 18.96 | ......<br>18.00<br>15.00 | 3073<br>2287<br>3339 |
| *7.52 | 8.00 | 1.69 | 9.21 | 9.00 | 4.71 | ...... | 4.71 | 4.00 | 1.12 | .82 | 22.48 | 18.00<br>18.50 | 2601<br>3336 |
| *7.01 | 8.00 | 1.82 | 8.83 | 9.00 | 2.44 | ...... | 2.44 | 2.00 | .70 | .41 | 18.14 | 18.00<br>16.50 | 2598<br>3335 |
| *6.60 | 7.00 | 1.10 | 7.70 | ...... | 3.70 | ...... | 3.70 | 3.00 | 1.05 | .82 | 20.23 | ........ | 3919 |
| 7.52 | 7.00 | 1.41 | 8.93 | ...... | 2.12 | ...... | 2.12 | 1.00 | .48 | .21 | 14.77 | 12.50 | 3488 |
| 9.95 | 10.00 | .86 | 10.81 | ...... | 7.21 | ...... | 7.21 | 6.50 | .59 | .41 | 25.04 | 20.00 | 3508 |
| *7.61 | 8.00 | 1.16 | 8.77 | ...... | 3.09 | ...... | 3.09 | 2.00 | 1.64 | 1.64 | 23.40 | 20.00<br>20.00<br>22.50 | 3386<br>2254<br>3511 |
| 8.32 | 8.00 | 1.96 | 10.28 | ...... | 1.39 | ...... | 1.39 | 1.00 | .88 | .82 | 19.39 | 16.00 | 2255 |
| *6.91 | 8.00 | 1.48 | 8.39 | ...... | 4.25 | ...... | 4.25 | 3.00 | 1.84 | 1.64 | 24.93 | 19.25 | 3487 |
| 8.26 | 8.00 | 1.33 | 9.59 | ...... | 5.09 | ...... | 5.09 | 5.00 | 1.73 | 1.64 | 26.65 | 21.00<br>21.00<br>21.00 | 3489<br>2600<br>3508 |
| 8.16 | 8.00 | 2.36 | 10.52 | ...... | 5.33 | 3.98 | *9.31 | 10.00 | 1.93 | 1.65 | 33.18 | 28.50<br>27.00<br>27.00 | 2501<br>2471<br>2557 |
| *8.30 | 8.50 | 2.35 | 10.65 | ...... | 1.60 | ...... | 1.60 | 1.00 | 1.66 | 1.65 | 23.16 | 20.25<br>22.00<br>23.00 | 2470<br>2292<br>2485 |
| 8.40 | 8.00 | 2.68 | 11.08 | ...... | 8.07 | ...... | 8.07 | 8.00 | 1.12 | .82 | 27.46 | 23.00<br>22.50<br>22.75 | 2573<br>2472<br>2847 |
| 7.70 | ...... | 7.70 | 15.40 | 15.00 | 5.84 | ...... | 5.84 | 5.00 | 2.61 | 2.47 | 33.78 | ......<br>34.50 | 2821<br>3296 |
| 10.68 | 7.00 | 1.81 | 12.49 | 11.00 | 3.60 | 1.27 | 4.87 | 5.00 | 1.85 | 1.65 | 29.86 | 27.00 | 3406 |
| *7.08 | 8.00 | 3.32 | *10.40 | 11.00 | 3.60 | 8.74 | 12.34 | 10.00 | 2.08 | 1.64 | 37.28 | 28.00 | 2655 |
| 8.75 | 7.00 | 4.72 | 13.47 | 12.00 | 6.02 | ...... | 6.02 | 5.00 | *1.57 | 2.00 | 28.77 | 30.00 | 3032 |
| 6.83 | 7.00 | 2.19 | 9.02 | ...... | 4.58 | ...... | 4.58 | 4.00 | 1.88 | 1.82 | 25.75 | ........ | 2649 |
| 7.17 | 7.00 | 1.91 | 9.08 | ...... | 5.94 | ...... | 5.94 | 6.00 | 1.93 | 2.04 | 27.62 | 23.00 | 2647 |
| 6.15 | 6.00 | 1.19 | 7.81 | 7.00 | 5.07 | ...... | 5.07 | 5.00 | .99 | .82 | 20.96 | 19.00 | 2957 |
| *7.95 | 9.00 | 2.14 | 10.09 | 10.00 | 2.24 | ...... | 2.24 | 2.00 | 2.56 | 2.47 | 27.46 | 28.00<br>25.00 | 2405<br>2426 |
| 6.73 | 6.00 | 1.40 | 8.13 | 7.00 | 6.15 | ...... | 6.15 | 6.00 | 1.00 | .82 | 22.80 | ......<br>......<br>23.00 | 2568<br>2539<br>3182 |
| 9.31 | 9.00 | 1.53 | 10.84 | 10.00 | 2.56 | ...... | 2.56 | 2.00 | .89 | .82 | 21.34 | 25.00 | 2499 |
| 6.21 | 6.00 | .92 | 7.13 | 7.00 | 8.27 | 1.67 | 9.94 | 10.00 | 3.60 | 3.29 | 38.18 | 36.00 | 2409 |
| 7.92 | 8.00 | 2.98 | 10.90 | ...... | 1.60 | .70 | 2.30 | 2.00 | 1.11 | .82 | 21.46 | 17.00 | 3359 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS, HAGERSTOWN, MD. | | |
| 2995 | †C. C. C. Pride of the Valley, .......... | Elmer Radel, Hickory Corners, .... | 8.98 |
| 2605 | | Nickles & Stewart, Shippensburg, .. | |
| 3324 | | L. H. Leiter & Bro., Greencastle,.. | |
| 3373 | C. C. C. Royal Special, .................... | E. W. Rupp, Shiremanstown, ...... | 11.65 |
| 3323 | C. C. C. Valley Bone Mixture, ............ | L. H. Leiter & Bro., Greencastle,.. | 7.90 |
| | COE, MORTIMER CO., THE, NEW YORK CITY. | | |
| 2318 | †E. Frank Coe's Onondaga Special Fertilizer for all Crops. | I. W. Scott Co., Pittsburgh, ...... | 9.85 |
| 2541 | | Frank J. Zeigler, Myerstown, R. No. 5. | |
| 2439 | E. Frank Coe's Red Brand Excelsior Guano for Market Gardening. | S. F. Rurig, Catawissa, R. No. 3,.. | 10.78 |
| 3109 | E. Frank Coe's Universal Fertilizer, .... | Francis Baker, Everett, ............ | 10.98 |
| 2402 | †E. Frank Coe's Western New Yorker, .. | C. P. Mathews, Dalton, .......... | 10.83 |
| 2438 | | S. P. Rurig, Catawissa, R. No. 3,.. | |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 2442 | †Columbia Crop and Soil Improver, .... | M. P. Whitenight, Bloomsburg, ... | 6.60 |
| 3293 | | C. M. Elno, Wapwallopen, R. D.,.. | |
| | CONSUMERS' FERTILIZER CO., NEW YORK. | | |
| 3518 | Mak Gro, ...................................... | ........................................ | 8.70 |
| | HENRY COPE & CO., LINCOLN UNIVERSITY, PA. | | |
| 3022 | Old Guard Phosphate, ...................... | Lyburn Whitaker, Oxford, .......... | 6.60 |
| 3018 | Pure Bone Phosphate, ...................... | Lyburn Whitaker, Oxford, .......... | 7.68 |
| 3020 | Queen of Elk Valley, ........................ | Lyburn Whitaker, Oxford, .......... | 11.65 |
| 3019 | Wheat Grower and Complete Manure, .... | Lyburn Whitaker, Oxford, .......... | 11.68 |
| | JOSIAH COPE & CO., BALTIMORE, MD. | | |
| 3015 | Josiah Cope & Co. Wheat and Grass Special. | OW. Shortlidge, Lincoln University, | 10.02 |
| | JAS G. DOWNWARD CO., COATESVILLE, PA. | | |
| 2570 | All Crop Fertilizer, ......................... | L. G. Lehman, Palmyra, R. D.,.. | 8.48 |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | | |
| 1304 | Farmers' Choice, ............................ | D. J. Beitzel, Mechanicsburg, ...... | 5.28 |
| 2012 | Farmers' Favorite, .......................... | New Providence Coal Co., New Providence. | 6.30 |
| 1270 | †Farmers' Success, ........................... | Jas. Sherman, Palmyra, R. No. 2, | 6.73 |
| 1811 | | M. H. Boyer, Pine Grove, ........ | |
| 2558 | Eureka Fish and Potash, ................ | Lewis Arnold, Juniata, ............ | 7.90 |
| 2014 | Grain and Grass, ............................ | New Providence Coal Co., New Providence. | 10.30 |
| | FARMERS' FERTILIZER & FEED CO., WESTMINSTER, MD. | | |
| 2901 | No. 3 Phosphate, ............................ | Good & Kline, Sells Station, ...... | 8.58 |
| 2280 | XX Phosphate, ............................... | C. C. Brown, East Berlin, ........ | 8.68 |
| | THE FARMERS' FERTILIZER WORKS, ELIZABETHTOWN, PA. | | |
| 3067 | †Farmers' I. X. L., ........................ | B. F. Horting, Newport, ........... | 8.95 |
| 3054 | | B. F. Garman, Elizabethtown, .... | |
| 3227 | | A. L. Lucts, Selinsgrove, .......... | |
| | FARMERS' UNITED BONE FERTILIZER CO., READING, PA. | | |
| 3177 | Special Fish and Potash, ................. | Heffner & Deitrich, Kutztown, ..... | 8.30 |
| 2988 | †Grain and Grass Grower, ............. | J. W. Bronson, New Galilee, | 7.95 |
| 3175 | | Berks County Poor Farm. | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. Available. Found. | Phosphoric Acid in 100 Pounds. Available. Guaranteed. | Phosphoric Acid in 100 Pounds. Insoluble. | Phosphoric Acid in 100 Pounds. Total. Found. | Phosphoric Acid in 100 Pounds. Total. Guaranteed. | Potash in 100 Pounds. Present as muriate. | Potash in 100 Pounds. Present as sulphate. | Potash in 100 Pounds. Total. Found. | Potash in 100 Pounds. Total. Guaranteed. | Nitrogen in 100 lbs. Found. | Nitrogen in 100 lbs. Guaranteed. | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.90 | 8.00 | .87 | 8.77 | ...... | 3.47 | ...... | 3.47 | 3.00 | .52 | .41 | 16.32 | 14.50<br>15.00<br>16.00 | 2995<br>2605<br>3324 |
| 9.89 | 10.00 | .35 | 10.24 | ...... | 6.67 | 1.17 | *7.84 | 10.00 | 3.13 | 2.47 | 37.27 | 32.00 | 3373 |
| 8.42 | 8.00 | .98 | 9.40 | ...... | 2.46 | ...... | 2.46 | 2.00 | 1.78 | 1.65 | 24.15 | 20.00 | 3323 |
| 7.23 | 7.00 | 1.70 | 8.93 | 8.00 | 1.51 | ...... | 1.51 | 1.00 | .91 | .82 | 18.25 | 23.00<br>...... | 2318<br>2541 |
| 8.09 | 8.00 | 2.38 | 10.47 | 9.00 | 4.27 | 3.24 | 7.51 | 7.00 | 3.36 | 3.29 | 37.50 | 32.50 | 2439 |
| 7.98 | 8.00 | 1.64 | 9.62 | 9.00 | 3.40 | ...... | 3.40 | 3.00 | 1.80 | 1.65 | 25.00 | 22.00 | 3109 |
| 8.13 | 8.00 | 1.57 | 9.70 | 9.00 | 4.27 | ...... | 4.27 | 4.00 | .84 | .82 | 21.67 | 24.00<br>20.00 | 2402<br>2438 |
| 9.01 | 9.00 | 1.19 | 10.20 | 9.50 | 9.35 | ...... | 7.35 | 7.00 | 1.14 | .82 | 26.90 | 21.50<br>23.00 | 2442<br>2393 |
| 6.74 | 6.00 | .21 | 6.95 | ...... | ...... | 9.55 | 9.55 | 8.00 | 3.17 | 3.28 | 37.78 | ........ | 3518 |
| *7.74 | 8.00 | 4.17 | 11.91 | 9.00 | 4.44 | ...... | 4.44 | 3.00 | .91 | .82 | 23.46 | ........ | 3022 |
| 8.68 | 8.00 | 2.96 | 11.64 | 10.00 | 3.75 | ...... | 3.75 | 2.50 | 1.60 | 1.64 | 25.82 | 27.00 | 3018 |
| 7.80 | 7.00 | .93 | *8.73 | 9.00 | 9.26 | ...... | 9.26 | 8.00 | *1.50 | 1.75 | 29.08 | 27.00 | 3020 |
| 7.42 | 7.00 | .93 | *8.35 | 9.00 | 6.12 | ...... | 6.12 | 4.00 | 1.29 | 1.25 | 24.56 | 24.00 | 3019 |
| 8.08 | 8.00 | 1.94 | 10.02 | 9.00 | 1.28 | ...... | 1.28 | 1.00 | .99 | .82 | 19.47 | 18.50 | 3015 |
| 6.94 | 7.00 | .61 | *7.55 | 8.00 | 2.91 | ...... | 2.91 | 3.00 | .58 | .41 | 17.48 | ........ | 2570 |
| 8.02 | 8.00 | .60 | 8.62 | 8.50 | 4.81 | ...... | 4.81 | 4.00 | 1.13 | .82 | 22.99 | 20.00 | 1304 |
| 8.85 | 8.00 | .83 | 9.68 | 8.50 | 3.38 | ...... | 3.38 | 2.00 | 2.18 | 1.64 | 27.33 | 21.00 | 2012 |
| 8.63 | 8.00 | .70 | 9.33 | 8.50 | 9.51 | ...... | 9.51 | 7.00 | 1.22 | .82 | 28.72 | ......<br>20.00 | 1270<br>1811 |
| 8.30 | 8.00 | .62 | 8.92 | 8.50 | 1.34 | ...... | 1.34 | 1.00 | .56 | .41 | 17.05 | 16.00 | 2558 |
| 9.37 | 8.00 | .80 | 10.17 | 8.50 | 2.81 | ...... | 2.81 | 2.00 | .90 | .82 | 21.28 | 18.00 | 2014 |
| 9.37 | 8.00 | 1.21 | 10.58 | 9.00 | 3.79 | ...... | 3.79 | 3.00 | 1.30 | 1.23 | 24.37 | 17.00 | 2901 |
| 9.03 | 9.00 | .85 | 9.88 | 10.00 | 3.49 | ...... | 3.49 | 3.00 | .91 | .82 | 21.72 | ........ | 2280 |
| 8.89 | 8.00 | 2.52 | 11.41 | ...... | 2.99 | ...... | 2.99 | 2.00 | 1.61 | 1.65 | 25.04 | 19.50<br>21.00<br>20.00 | 3067<br>3054<br>3227 |
| 8.35 | 8.00 | .50 | 8.85 | ...... | 3.73 | 1.57 | 5.30 | 5.00 | 1.54 | 1.65 | 26.01 | 22.50 | 3177 |
| 7.81 | 8.00 | .73 | 8.54 | ...... | 3.85 | ...... | 3.85 | 4.00 | .92 | .82 | 20.74 | ......<br>16.65 | 2988<br>3175 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | W. S. FARMER & CO., BALTIMORE, MD. | | |
| 3117 | W. S. Farmer & Co's. Potato and Tobacco Phosphate. | W. D. Blackburn, Fishertown, | 6.40 |
| | MAHLON FRETZ, SELLERSVILLE, PA. | | |
| 3426 | Fretz's Standard Phosphate, | Mahlon Fretz, Sellersville, | 7.58 |
| | JOSEPH R. GATHROP, KENNETT SQUARE, PA. | | |
| 3023 | Complete Ammoniated Special Phosphate for Corn, Oats and Wheat. | Jos. R. Gawthrop, Kennett Square, | 6.45 |
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | | |
| 2828 | †Ammoniated Bone Phosphate, | Benj. Lambert, Madisonburg, | 8.63 |
| 2892 | | Adam Krug, Allenwood, | |
| 2339 | †Fish, Bone and Potash, | J. F. Hogsett & Son, Uniontown, | 6.03 |
| 2281 | | H. J. Van Dyke, Gettysburg, | |
| 2381 | | Jas. Itell, Portage, R. No. 1, | |
| 3501 | Fruit and Root Compound, | Willis C. Herr, Strasburg, | 7.48 |
| 2382 | †Harvest Queen Phosphate, | Jas. Itell, Portage, R. No. 1, | 8.75 |
| 2308 | | W. C. Leas, East Berlin, R. No. 1, | |
| 2555 | | J. J. Coleman, Gratz, | |
| 2383 | †Peerless Fertilizer, | Frank Kiskadden, Kittanning, R. No. 4. | 8.73 |
| 2252 | | J. B. Spera, Dillsburg, | |
| 2422 | | Hartley & Blaine, Turbotville, | |
| 2554 | †Royal Potash Guano, | J. J. Coleman, Gratz, | 9.54 |
| 2418 | | Hartley & Blaine, Turbotville, | |
| 2585 | | H. J. Webner, Harrisburg, | |
| 2419 | †Special Guano, | Hartley & Blaine, Turbotville, | 7.18 |
| 2309 | | W. C. Leas, East Berlin, R. No. 1, | |
| 2786 | | John A. Kuntz, New Tripoli, | |
| 2488 | †Spring Crop Grower, | S. K. Chambers & Bro., West Grove, | 6.58 |
| 2587 | | H. J. Webner, Harrisburg, R. D. 1, | |
| 2531 | Stable Manure Substitute, | S. K. Chambers & Bro., Elkview, | 5.40 |
| 2883 | †Valley Fertilizer, | R. M. Arbogast, Winfield, | 9.20 |
| 3040 | | J. H. Harnish, Mechanicsburg, R. No. 3. | |
| | H. F. HAGER, QUAKERTOWN, PA. | | |
| 3421 | Farmers' Favorite Phosphate, | Henry F. Hager, Quakertown, | 11.65 |
| 3420 | Panic Phosphate, | Henry F. Hager, Quakertown, | 10.68 |
| | W. S. HASTINGS & SON, ATGLEN, PA. | | |
| 3438 | Octoraro, | W. S. Hastings & Son, Atglen, | 7.53 |
| | S. M. HESS & BRO., INC., PHILADELPHIA, PA. | | |
| 2859 | S. M. Hess & Bro's. Ammoniated Super Phosphate. | J. D. Hostetler, Lewistown, R. D., | 12.10 |
| 2842 | †S. M. Hess & Bro's. Fish and Potato Manure. | H. L. Smith & Son, McAllisterville, | 10.50 |
| 2435 | | S. J. Brungard, Salona, R. No. 1, | |
| 2996 | | H. C. Deppen, Herndon, | |
| 2681 | †S. M. Hess & Bro's. Wheat and Grass Manure. | A. F. Hengst, Osterburg, | 11.05 |
| 2542 | | S. D. Snyder, Myerstown, | |
| 2708 | | Porter Bros., Petersburg, | |
| | P. HOFFMAN & BRO., RAUBSVILLE, PA. | | |
| 3262 | Grangers' Choice, | P. Hoffman & Bro., Raubsville, | 6.00 |
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 2835 | †Hubbard's Oriental Phosphate, | H. M. Owen & Co., Lewistown, | 7.88 |
| 2358 | | F. P. Waite, Tyrone, | |
| 2908 | | J. Emory Maul, Iron Ore, | |
| 3443 | Hubbard's Standard Phosphate, | Oscar Buckey, Myerstown, R. No. 5, | 7.48 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.24 | 8.00 | 1.34 | 9.60 | 9.00 | 9.86 | ...... | 9.86 | 10.00 | 1.66 | 1.65 | 31.03 | ........ | 3117 |
| *6.06 | 7.00 | 2.04 | *8.10 | 8.75 | 1.24 | ...... | 1.24 | 1.00 | 1.12 | .80 | 17.84 | 20.00 | 3426 |
| 6.17 | 5.00 | 2.00 | 8.17 | 6.50 | 2.91 | ...... | 2.91 | 1.50 | 1.69 | 1.23 | 22.35 | 26.00 | 3028 |
| *7.67 | 8.00 | 2.18 | 9.85 | 9.00 | 2.46 | ...... | 2.46 | 2.00 | *1.44 | 1.65 | 22.40 | 21.90<br>20.00 | 2828<br>2892 |
| 7.02 | 7.00 | 2.77 | 9.79 | 8.00 | 3.59 | ...... | 3.59 | 3.00 | 1.60 | 1.50 | 23.88 | 23.00<br>21.00<br>24.00 | 2339<br>2281<br>2381 |
| 7.66 | 7.00 | .92 | 8.58 | 8.00 | 5.82 | ...... | 5.82 | 6.00 | 2.25 | 2.05 | 28.87 | 27.00 | 3501 |
| *8.05 | 9.00 | 1.06 | *9.11 | 10.00 | 3.44 | ...... | 3.44 | 3.00 | .96 | .85 | 20.96 | 24.00<br>18.75<br>19.00 | 2382<br>2308<br>2555 |
| 8.04 | 8.00 | 2.17 | 10.21 | 9.00 | 2.89 | ...... | 2.89 | 2.00 | .63 | .41 | 19.57 | 18.50<br>16.50<br>16.00 | 2383<br>2252<br>2242 |
| *7.62 | 8.00 | 1.80 | 9.42 | 9.00 | 4.48 | ...... | 4.48 | 4.00 | .90 | .85 | 21.72 | 18.50<br>18.00<br>19.00 | 2554<br>2418<br>2585 |
| *7.38 | 8.00 | 1.90 | 9.28 | 9.00 | 4.78 | ...... | *4.78 | 5.00 | 1.56 | 1.65 | 24.82 | 23.00<br>21.45<br>24.00 | 2419<br>2309<br>2786 |
| 6.31 | 6.50 | 3.76 | 10.07 | 7.50 | 3.85 | ...... | *3.85 | 4.50 | 1.66 | 1.65 | 24.08 | 23.00<br>21.50 | 2488<br>2587 |
| 5.83 | 5.00 | 2.04 | 7.87 | 6.00 | 3.94 | ...... | 3.94 | 4.00 | 3.46 | 2.75 | 31.06 | 27.00 | 2531 |
| 8.90 | 8.00 | .98 | 9.88 | 9.00 | 2.81 | ...... | 2.81 | 3.00 | .53 | .41 | 19.33 | 17.00<br>17.50 | 2883<br>3040 |
| 8.92 | 8.00 | 2.04 | 10.96 | 10.00 | 3.26 | ...... | 3.26 | 3.00 | 2.08 | 1.65 | 27.36 | 23.00 | 3421 |
| 8.31 | 8.00 | 1.19 | *9.50 | 10.00 | 2.63 | ...... | 2.63 | 2.00 | 1.30 | .82 | 22.08 | 19.00 | 3420 |
| 8.08 | 8.00 | .65 | 8.73 | ...... | 3.05 | ...... | 3.05 | 3.00 | 1.72 | 1.65 | 23.84 | 22.00 | 3438 |
| 8.40 | 8.00 | 1.44 | 9.84 | 9.00 | 2.06 | ...... | 2.06 | 2.00 | 1.79 | 1.65 | 23.96 | 21.50 | 2859 |
| 8.00 | 8.00 | 1.66 | 9.66 | 9.00 | 4.86 | ...... | 4.86 | 3.00 | 1.61 | 1.65 | 25.59 | 19.00<br>22.50<br>22.00 | 2842<br>2435<br>2996 |
| 8.35 | 8.00 | 1.47 | 9.82 | 9.00 | 2.20 | ...... | 2.20 | 2.00 | .93 | .82 | 20.19 | 19.00<br>......<br>...... | 2681<br>2542<br>2708 |
| *5.34 | 7.00 | 7.15 | 12.49 | 10.00 | 5.45 | ...... | 5.45 | 5.00 | 1.00 | .82 | 23.41 | 22.00 | 3262 |
| *7.33 | 8.00 | 1.79 | 9.12 | 9.00 | 2.51 | ...... | 2.51 | 2.00 | 1.22 | .82 | 20.77 | 20.00<br>18.50<br>17.00 | 2835<br>2358<br>2908 |
| *7.44 | 8.00 | 1.61 | 9.05 | 9.00 | 3.42 | ..... | 3.42 | 3.00 | 1.90 | 1.64 | 24.90 | 21.75 | 3448 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | M. P. HUBBARD & CO., BALTIMORE, MD. | | |
| 2469 | Hubbard's Special Mixture 2-8-10, | S. R. Hower, Catawissa, | 10.28 |
| 2936 | Hubbard's Celebrated Phosphate for General Use. | Geo. B. Murphy, Red Lion, | 6.43 |
| 2465 | †Hubbard's Farmers' Acme, | S. R. Hower, Catawissa, R. No. 1, | 8.07 |
| 2315 | | W. D. Myers, East Berlin, | |
| 2795 | | H. E. Deebel, Ringtown, | |
| 2316 | Hubbard's Old Economy, | W. D. Myers, East Berlin, | 7.60 |
| 2935 | †Hubbard's Special Potato and Tomato Fertilizer. | Geo. B. Murphy, Red Lion, | 7.85 |
| 2467 | | S. R. Hower, Catawissa, R. No. 1, | |
| 3224 | | F. A. Bingamon, Port Trevorton, | |
| | INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO. | | |
| 3265 | Celery and Potato Special, | M. Gillis, Hughsville, | 8.90 |
| 2984 | †Farmers' Choice, | Acie McDonald, Greenville, | 6.28 |
| 2822 | | D. H. Shivery, Bellefonte, R. D., | |
| 3143 | | Harmony Cereal Mills, Harmony, | |
| | T. S. KENDERDINE & SONS, NEWTOWN, PA. | | |
| 3113 | Kenderdine's B. Phosphate, | T. S. Kenderdine Sons, Newtown, | 9.05 |
| | KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA. | | |
| 2546 | †Keystone Ammoniated Super Phosphate and Potash. | A. B. Bumgardner, Palmyra, | 7.40 |
| 3194 | | Fred S. Nester, New Ringgold, | |
| 2425 | Keystone Economy Potash Compound, | E. A. Slagle, Paxinos, | 8.30 |
| 2544 | †Keystone Excelsior Wheat Grower, | A. B. Bumgardner, Palmyra, | 8.22 |
| 2424 | | E. A. Slagle, Paxinos, | |
| 3090 | | Henry Vogel, Bethlehem, | |
| 3088 | †Keystone General Manure, | R. O. Scudle, Weatherly, | 7.28 |
| 3034 | | Wm. M. Holbert, Warrington, | |
| 3250 | | V. S. Wagner, Hellertown, | |
| 2547 | †Keystone Grain and Grass Manure, | A. B. Bumgardner, Palmyra, | 7.88 |
| 2766 | | Chas. Shoffstall, Valley View, | |
| 3286 | †Keystone Royal Corn and Potato Manure, | R. E. Briggs, Nescopeck, | 8.06 |
| 2463 | | J. B. Crossley, Bloomsburg, | |
| 3447 | | Daniel Bensing, Meyerstown, | |
| 3249 | Keystone Special Penna. Grain Mixture, | V. S. Wagner, Hellertown, | 8.92 |
| 2545 | †Keystone Vegetable Guano, | A. B. Bumgardner, Palmyra, | 6.63 |
| 2767 | | Chester Shoffstall, Valley View, | |
| | LANCASTER BONE FERTILIZER CO., LANCASTER, PA. | | |
| 2911 | Lancaster Scientific Animal Bone Compound, | Josiah Flinchbaugh, Windsor, | 6.88 |
| 2276 | Special Guano, | Geo. T. March, Gettysburg, R. No. 6, | 8.43 |
| 2377 | †Keystone Standard, | Lenz & Burkhart, Loretto, R. No. 1, | 9.33 |
| 3277 | | Daniel Replogle, Woodbury, | |
| 3383 | | Harry Holderman, Jonestown, | |
| | LANCASTER CHEMICAL CO., LANCASTER, PA. | | |
| 3460 | No. 3 Pure Dissolved Animal Bone and Potash. | Isaac Patton, Lancaster, | 10.55 |
| 3505 | No. 4 Rising Sun Animal Bone, | I. B. Myer, Leola, | 11.96 |
| 3092 | No. 18 Success Brand, | Jas. DeWalt, Bethlehem, | 9.58 |
| 3064 | No. 14 Wheat and Grass Fertilizer, | M. G. Hench, Cisna Run, | 10.28 |
| | LEBANON FERTILIZER WORKS, LEBANON, PA. | | |
| 2759 | †Levan's Wheat and Grass Fertilizer | A. J. Fidler, Secy., Rock, | 5.58 |
| 2446 | | Zehner Bros., Bloomsburg, | |
| 2890 | | Robt. C. Meek Est., Allenwood, | |

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†Composite sample.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| *7.38 | 8.00 | .69 | *8.07 | 9.50 | 9.97 | ...... | 9.97 | 10.00 | 1.78 | 1.66 | 30.62 | 24.50 | 2469 |
| *7.49 | 8.00 | 1.27 | *8.76 | 9.50 | 2.60 | ...... | 2.60 | 2.00 | 1.26 | 1.66 | 21.01 | 19.00 | 2936 |
| 8.24 | 8.00 | .85 | *9.09 | 9.50 | 4.86 | ...... | 4.86 | 4.00 | .78 | .83 | 21.81 | 17.25<br>18.00<br>20.00 | 2465<br>2815<br>2795 |
| 9.29 | 8.00 | .68 | 9.97 | 9.00 | 2.48 | ...... | 2.48 | 2.00 | .46 | .42 | 15.94 | 16.00 | 2316 |
| 7.31 | 7.00 | 1.08 | 8.39 | 8.50 | 5.62 | ...... | 5.62 | 5.00 | *1.41 | 1.66 | 24.50 | 21.00<br>19.75<br>22.00 | 2935<br>2467<br>3224 |
| 8.39 | 8.00 | 1.93 | 10.32 | 9.00 | 7.69 | ...... | *7.69 | 10.00 | 1.64 | 1.60 | 29.26 | 27.00 | 3265 |
| *7.47 | 8.00 | 2.17 | 9.64 | 9.00 | 4.95 | ...... | 4.95 | 5.00 | .95 | .80 | 22.47 | 24.00<br>......<br>22.00 | 2984<br>2822<br>3143 |
| 8.99 | 7.00 | 2.51 | 11.50 | 9.00 | 3.07 | 2.46 | 5.53 | 5.00 | 2.74 | 2.47 | 33.51 | ........ | 3413 |
| *7.15 | 8.00 | 2.35 | 9.50 | 9.00 | 7.30 | 1.04 | 8.34 | 8.00 | 1.09 | .82 | 26.61 | 24.00<br>25.00 | 2546<br>3194 |
| *6.20 | 7.00 | 1.78 | 7.98 | 8.00 | 6.00 | 1.36 | 7.36 | 5.00 | 1.04 | .82 | 24.20 | 20.00 | 2425 |
| 6.89 | 7.00 | 2.03 | 8.92 | 8.00 | 5.39 | ...... | 5.39 | 5.00 | .90 | .82 | 22.02 | 21.50<br>20.00<br>19.50 | 2544<br>2424<br>3090 |
| *6.72 | 8.00 | 1.86 | *8.58 | 9.00 | 3.96 | ...... | 3.96 | 3.00 | *1.01 | 1.23 | 20.77 | 24.00<br>25.00<br>22.00 | 3068<br>3034<br>3250 |
| 7.36 | 7.00 | 1.34 | 8.70 | 8.00 | 1.86 | ...... | 1.86 | 1.00 | .89 | .82 | 18.54 | 18.00<br>17.50 | 2547<br>2766 |
| *7.29 | 8.00 | 2.07 | 9.36 | 9.00 | 5.73 | 4.17 | 9.91 | 10.00 | 1.68 | 1.64 | 31.69 | 27.00<br>28.00<br>28.00 | 3286<br>2463<br>3447 |
| *6.07 | 8.00 | 1.96 | *8.03 | 9.00 | 1.50 | ...... | *1.50 | 2.00 | 1.02 | .82 | 17.66 | 18.50 | 3249 |
| 6.99 | 6.00 | 1.68 | 8.67 | 7.00 | 4.91 | ...... | *4.91 | 6.00 | *1.44 | 1.64 | 23.95 | 24.25<br>24.00 | 2545<br>2767 |
| *7.56 | 8.00 | .64 | *8.20 | 9.00 | 4.39 | ...... | 4.39 | 4.00 | 1.46 | 1.25 | 23.52 | 23.00 | 2941 |
| 7.19 | 7.00 | .58 | *7.77 | 8.00 | 4.33 | ...... | 4.33 | 4.00 | .96 | .82 | 20.78 | 17.50 | 2276 |
| 9.88 | 10.00 | .85 | *10.73 | 11.00 | 2.20 | ...... | 2.20 | 2.00 | .43 | .28 | 16.14 | 19.50<br>19.00<br>19.00 | 2377<br>3277<br>3383 |
| *8.43 | 10.00 | 2.40 | 10.83 | 11.00 | 5.05 | ...... | 5.05 | 5.00 | 1.61 | 1.65 | 26.61 | ........ | 3460 |
| *8.80 | 10.00 | 2.67 | 11.47 | 11.00 | 2.68 | ...... | 2.68 | 2.00 | *2.25 | 2.46 | 27.67 | 26.50 | 3506 |
| *7.71 | 8.00 | 1.49 | 9.20 | 9.00 | 3.60 | .55 | 4.15 | 4.00 | 1.16 | .82 | 22.59 | 21.00 | 3092 |
| *5.54 | 8.00 | 1.38 | *6.92 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 1.20 | .82 | 18.48 | ........ | 3064 |
| *7.37 | 8.00 | 1.40 | *8.77 | 9.00 | 5.83 | ...... | 5.83 | 5.00 | 1.16 | .82 | 23.78 | 18.00<br>21.00<br>...... | 2759<br>2446<br>2890 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | LISTER AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | | |
| 2508 | †Lister's Ammoniated Dissolved Super-Phosphate. | W. E. Erwin, Somerton, | 10.80 |
| 2445 | | Zehner Bros., Bloomsburg, | |
| 2976 | | J. R. Hanks, Springboro, | |
| 2949 | †Lister's Crescent Complete Manure, | Erwin C. Rover, Glen Rock, | 11.05 |
| 2444 | | Zehner Bros., Bloomsburg, | |
| 3042 | | Miller & Eurish, Mechanicsburg, R. No. 3. | |
| 2561 | †Lister's Harvest Queen Phosphate, | C. G. Shetron, Millersburg, | 11.08 |
| 2298 | | J. H. Hersh, New Oxford, | |
| 2611 | | Allison & Fogelsonger, Shippensburg, | |
| 2610 | †Lister's Golden Sheaf, | Allison & Fogelsonger, Shippensburg, | 11.60 |
| 2359 | | C. S. Furry, Roaring Springs, | |
| 3076 | | J. H. Ellenmeyer, Liverpool, | |
| 3252 | †Lister's Grass and Oat Fertilizer, | Titus Bachman, Hellertown, | 10.53 |
| 2392 | | N. J. Norton, New Albany, | |
| 3290 | | C. M. Fox, Wapwallopen, | |
| 680 | Oneida Special, | I. A. Thompson, North Rome, | 6.30 |
| 2886 | †Lister's Potato and Corn No. 2 Fertilizer, | J. I. Meek, Allenwood, | 9.85 |
| 3254 | | Howard Weaver, Shimersville, | |
| 543 | †Potato No. 2 Fertilizer, | R. D. Sames, Centre Valley, | 6.38 |
| 825 | | F. H. Heath, Corry, | |
| 2668 | †Lister's Special Crop Producer, | Arndt & Redline, Cherryville, | 11.20 |
| 2369 | | Bert Sutton, Ashville, R. No. 1, | |
| 2688 | | D. B. Griffith, Wolfsburg, R. D., | |
| 1114 | Special Potato Fertilizer, | Geo. Bard, Leacock, | 8.63 |
| 2205 | †Lister's Special Wheat Fertilizer, | Geo. B. Thompson, State College, R. D., | 11.70 |
| 2707 | | Nevin Miller, Cottage, | |
| 2983 | †Lister's Standard Pure Super Phosphate of Lime. | Grove & Uffleman, Park, | 10.68 |
| 2932 | | Grove & Uffleman, Park, | |
| 2977 | | J. R. Hanks, Springboro, | |
| | THE FREDERICK LUDLAM CO., NEW YORK AND BALTIMORE. | | |
| 2721 | Ludlam's Cecrops Fertilizer, C. and G. Brand. | S. L. Smith, Mill Creek, | 10.88 |
| | THE MAPES FORMULA AND PERUVIAN GUANO CO., NEW YORK. | | |
| 2504 | †Mapes' Complete Manure, A. Brand, | John B. Sattherwaite, Woodburne, | 10.53 |
| 3195 | | F. W. Hutton, Conyngham, | |
| 3189 | Mapes' Complete Manure 10% Potash, | Geo. A. Fenstermacher, Tamaqua, | 6.53 |
| | NOAH MARKEL, SEITZLAND, PA. | | |
| 2942 | Markel's A. C. C. Phosphate, | John W. Sheffer, Red Lion, R. No. 2, | 9.50 |
| 2931 | Markel's Ammoniated Phosphate, | John W. Sheffer, Red Lion, R. No. 2, | 5.50 |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | | |
| 2454 | Martin's Claremont Vegetable Grower, | W. W. Parker, Rohrsburg, | 11.70 |
| 2979 | †Martin's Dissolved Organic Compound, | Andrew Moore, Enon Valley, R. No. 2. | 11.08 |
| 2775 | | A. F. Kimmel, Orwigsburg, | |
| 3231 | | F. J. Novinger, Lewistown, | |
| 3352 | Martin's Extra Sure Grower, | J. D. Goldsmith, Williamson, | 8.45 |
| 2452 | Martin's Pure Animal Bone and Potash, | W. W. Parker, Rohrsburg, | 5.55 |
| | THE MILLER FERTILIZER CO., BALTIMORE, MD. | | |
| 2940 | †Ammoniated, | F. H. Shenberger, Red Lion, R. No. 1. | 8.80 |
| 3016 | | M. T. Hoskins, Hickory Hill, | |
| 2849 | †M. B. S., | D. B. Esh, Spruce Hill, | 7.48 |
| 2728 | | J. M. Lutz, Shirleysburg, | |
| 3461 | | S. Book & Bro., Quarryville, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 7.12 | 7.00 | 2.90 | 10.02 | 8.00 | 1.97 | ...... | 1.97 | 1.50 | 2.28 | 2.06 | 25.52 | 26.00<br>23.50<br>24.00 | 2508<br>2445<br>2976 |
| *7.43 | 8.00 | 2.53 | 9.96 | 9.00 | 5.52 | ...... | 5.52 | 5.00 | 1.72 | 1.65 | 26.56 | 21.50<br>25.00<br>23.00 | 2949<br>2444<br>3042 |
| 8.90 | 9.00 | 1.91 | 10.81 | 10.00 | 2.41 | ...... | 2.41 | 2.00 | 1.34 | 1.23 | 23.00 | 22.50<br>23.00<br>20.00 | 2561<br>2298<br>2611 |
| 8.23 | 8.00 | .98 | 9.21 | 9.00 | 2.27 | ...... | 2.27 | 2.00 | .54 | .41 | 15.49 | 16.00<br>17.00<br>...... | 2610<br>2359<br>3076 |
| 7.93 | 8.00 | 1.41 | 9.34 | 9.00 | 4.32 | ...... | 4.32 | 4.00 | 1.20 | .82 | 23.05 | ......<br>25.00<br>21.00 | 3252<br>2392<br>3290 |
| 7.10 | 7.00 | 1.58 | 8.68 | 8.00 | 1.25 | ...... | 1.25 | 1.00 | .93 | .82 | 18.02 | ........ | 680 |
| *8.54 | 10.00 | 1.86 | *10.40 | 11.00 | 4.66 | ...... | 4.66 | 4.00 | 1.83 | 1.65 | 27.19 | ......<br>18.00 | 2886<br>3254 |
| 9.81 | 10.00 | 2.58 | 12.39 | 11.00 | 4.39 | ...... | 4.39 | 4.00 | 1.80 | 1.65 | 28.34 | 28.00<br>28.00 | 543<br>825 |
| 6.92 | 7.00 | 1.68 | 8.60 | 8.00 | 1.68 | ...... | 1.68 | 1.00 | .97 | .82 | 18.36 | 17.00<br>16.80<br>17.00 | 2668<br>2369<br>2688 |
| *7.34 | 8.00 | 2.27 | 9.61 | 9.00 | 3.18 | ...... | 3.18 | 3.00 | 2.08 | 1.65 | 25.59 | 22.80 | 1114 |
| 8.28 | 8.00 | 1.38 | 9.66 | 9.00 | 3.01 | ...... | 3.01 | 3.00 | 1.76 | 1.65 | 24.56 | ......<br>......<br>20.00 | 2805<br>2707<br>2933 |
| 9.44 | 9.00 | 2.03 | 11.47 | 10.00 | 2.54 | ...... | 2.54 | 2.00 | 2.76 | 2.47 | 30.14 | 23.50<br>26.00 | 2932<br>2977 |
| 8.32 | 8.00 | 1.00 | 9.32 | 9.00 | 1.94 | ...... | 1.94 | 2.00 | .63 | .41 | 18.31 | 17.00 | 2721 |
| *8.24 | 10.00 | 3.86 | 12.10 | 12.00 | 2.86 | ...... | 2.86 | 2.50 | 2.56 | 2.47 | 29.19 | 38.00<br>32.00 | 2504<br>3195 |
| *2.68 | 3.00 | 3.06 | 5.74 | 5.00 | 8.98 | ...... | *8.98 | 10.00 | 2.48 | 2.06 | 29.20 | 33.00 | 3189 |
| 8.33 | 7.00 | 1.38 | 9.71 | 8.00 | 4.00 | 4.91 | 8.91 | 8.00 | 1.60 | 1.64 | 31.12 | 23.50 | 2942 |
| 9.18 | 8.00 | 1.40 | 10.58 | 9.00 | 2.39 | ...... | 2.39 | 2.00 | 1.66 | 1.64 | 24.43 | 19.00 | 2931 |
| 7.46 | 7.00 | 2.00 | 9.46 | ...... | 2.67 | 2.89 | 5.56 | 5.00 | 2.51 | 2.46 | 30.58 | 26.00 | 2454 |
| 9.52 | 9.00 | 1.86 | 11.38 | ..... | 2.46 | ...... | 2.46 | 2.00 | 1.21 | 1.08 | 23.00 | 22.00<br>......<br>20.00 | 2979<br>2775<br>3231 |
| 8.98 | 8.00 | 2.66 | 11.64 | ...... | 2.27 | ...... | 2.27 | 2.00 | .91 | .82 | 21.25 | 17.00 | 3352 |
| 5.08 | ...... | 10.67 | *15.75 | 16.00 | 2.25 | ...... | *2.25 | 2.50 | 1.62 | 1.64 | 24.31 | 26.50 | 2452 |
| 8.26 | 8.00 | .68 | 8.94 | 8.50 | 2.46 | ...... | 2.46 | 2.00 | 1.76 | 1.65 | 23.62 | 20.00<br>26.00 | 2940<br>3016 |
| 7.38 | 7.00 | .96 | 8.34 | 7.50 | 3.16 | ...... | 3.16 | 3.00 | 1.01 | .83 | 20.18 | ......<br>20.00<br>18.00 | 2849<br>2728<br>3461 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | THE MILLER FERTILIZER CO., BALTIMORE, MD. | | |
| 2239 | No. 1 Potato and Vegetable Grower, .... | H. H. Klingler, Selinsgrove, ...... | 13.15 |
| 2277 | Special 2-8-5, .... | Biglerville Warehouse Co., Biglerville. | 9.63 |
| 2975 | †Special Potato Fertilizer, .... | Jacob Raun, Fairview, .... | 8.15 |
| 2833 | | J. S. Waite & Co., Bellefonte, R. D., | |
| 2958 | | J. P. Schuchast, New Freedom, .. | |
| 2954 | Special Tobacco Grower, .... | J. H. Bartenslager, Stewartstown, | 9.25 |
| | MOWERY LATSHAW HARDWARE CO., SPRING CITY, PA. | | |
| 3427 | Clover Brand Phosphate, .... | Mowrey Latshaw Hardware Co., Spring City. | 11.06 |
| | NASSAU FERTILIZER CO., NEW YORK. | | |
| 2397 | Plow Brand, .... | Peter Ace, Tunkhannock, .... | 7.80 |
| 2246 | †Wheat and Grass Grower, .... | C. R. Bentz, Wellsville, .... | 6.75 |
| 3452 | | Chas. Brubacher, Ephrata, R. No. 2, | |
| | G. OBER & SONS CO., BALTIMORE, MD. | | |
| 2928 | †Ober's Farmers' Mixture, .... | Jonathan Geesey, Dallastown, ...... | 8.53 |
| 2343 | | A. B. Mock, Martinsburg, .... | |
| 2989 | | John Phillipps, Sunbury, R. No. 3, | |
| 2314 | †Ober's Independent Ammoniated Super Phosphate. | W. D. Myers, East Berlin, ........ | 8.83 |
| 3318 | | J. A. Witherspoon, Mercersburg, .. | |
| 2365 | †Ober's Overland Special Mixture, ...... | Shettig Bros., Ebensburg, .... | 10.50 |
| 2991 | | John Phillipps, Sunbury, R. No. 3, | |
| | OYLER & SPANGLER, GETTYSBURG, PA. | | |
| 2294 | Gettysburg, .... | Oyler & Spangler, Gettysburg, .... | 6.60 |
| | PATAPSCO GUANO CO., BALTIMORE, MD. | | |
| 1172 | Patapsco Crop Feeder, .... | E. H. Meeker, Wilawanna, ........ | 10.45 |
| 3361 | Patapsco General Crop Producer, .... | Henry Kocher, Pilou, .... | 11.30 |
| 2924 | Sea Gull Guano, .... | Henry P. Kocher, Wrightsville, .... | 9.75 |
| 3039 | Patapsco Special Wheat Compound Animal Bone Base. | Chas. H. Nailor, Mechanicsburg, R. D. 3. | 12.63 |
| | J. D. PERKINS, COATESVILLE, PA. | | |
| 2509 | Perkins' Special Bono Manure, .... | J. D. Perkins, Coatesville, .... | 10.83 |
| | PIEDMONT-MT. AIRY GUANO CO., BALTIMORE, MD. | | |
| 3318 | Levering's Ammoniated Bone, .... | H. P. McLaughlin, Mason Dixon, .. | 7.96 |
| 2911 | †Levering's Harvest Queen, .... | H. H. Loose, Menges Mills, ........ | 10.73 |
| 3332 | | Michael Ickes, & Son, Scotland, .. | |
| 3372 | Levering's Standard, .... | P. C. Gochanour, Siddonsburg, .... | 8.18 |
| 2516 | Piedmont Farmers' Favorite, .... | H. W. McNair, Mechanicsville, .... | 7.25 |
| 2515 | Piedmont Perfection Guano, .... | H. W. McNair, Mechanicsville, .... | 8.45 |
| 2298 | Piedmont Royal Ammoniated Bone and Potash. | H. D. & J. F. Bream, Gettysburg, | 5.57 |
| | PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA. | | |
| 3285 | Corn and Potato Fertilizer, .... | Weddle & Sutton, West Newton, .. | 6.83 |
| 2329 | Keystone Fertilizer, .... | P. H. Saxman, Latrobe, .... | 4.08 |
| 2323 | Pure Bone with Potash, .... | Jos. Tayolr, R. F. D. Irwin, ...... | 6.60 |
| | FOR THE POLOCK FERTILIZER CO., BALTIMORE, MD., By AM. AG. CHEM. CO. | | |
| 2680 | †The Pollock Fertilizer Co. Owl Brand Guano. | Frank Oster, Osterburg, .... | 9.08 |
| 2350 | | J. H. Longnecker, Woodbury, ...... | |
| 2742 | | Francis Baker, Everett, .... | |
| 2312 | The Pollock Fertilizer Co. Special Potato and Tobacco Fertilizer. | Michael Burgeard, East Berlin, ... | 13.73 |
| | PUGH & LYONS, OXFORD, PA. | | |
| 3434 | Bone Phosphate, .... | S. R. Dickey & Co., Oxford, ...... | 5.58 |
| 3433 | B. R. P. Phosphate, .... | S. R. Dickey & Co., Oxford, ...... | 6.25 |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.22 | 8.00 | .18 | 8.40 | 8.50 | 5.57 | ...... | *5.57 | 7.00 | 3.68 | 3.70 | 35.40 | 34.50 | 2239 |
| 8.27 | 8.00 | .72 | 8.99 | 8.50 | 4.89 | ...... | 4.89 | 5.00 | 1.78 | 1.65 | 26.42 | 24.00 | 2277 |
| 7.12 | 7.00 | .78 | 7.90 | 7.50 | 4.85 | ...... | 4.85 | 5.00 | .76 | .83 | 20.40 | 24.00<br>20.00<br>19.00 | 2975<br>2833<br>2958 |
| *7.76 | 8.00 | .80 | 8.56 | 8.50 | 3.60 | .63 | 4.23 | 4.00 | 1.80 | 1.65 | 25.33 | 23.00 | 2954 |
| 8.74 | 8.00 | 1.78 | 10.52 | ...... | 5.14 | ...... | 5.14 | 5.00 | 1.82 | 1.64 | 27.63 | 25.00 | 3427 |
| 9.03 | 8.00 | 1.50 | 10.53 | 9.00 | 2.39 | ...... | 2.39 | 2.00 | 1.69 | 1.65 | 24.55 | 23.00 | 2397 |
| 8.10 | 8.00 | 1.72 | 9.82 | 9.00 | 1.87 | .24 | 2.11 | 2.00 | .86 | .82 | 19.56 | 16.50<br>18.00 | 2246<br>3452 |
| 9.14 | 9.00 | 1.28 | 10.42 | 10.00 | 2.46 | ...... | 2.46 | 2.00 | .81 | .82 | 20.48 | 18.50<br>18.00<br>18.00 | 2928<br>2343<br>2989 |
| 9.99 | 8.00 | 1.08 | 11.07 | 9.00 | 1.27 | ...... | 1.27 | 1.00 | .91 | .82 | 17.48 | 15.00<br>20.00 | 2314<br>3313 |
| 8.80 | 8.00 | .89 | 9.69 | 9.00 | 8.07 | ...... | *8.07 | 10.00 | *1.33 | 1.64 | 28.17 | 30.00<br>26.00 | 2365<br>2991 |
| *7.59 | 8.00 | 2.39 | 9.98 | 10.00 | 5.51 | ...... | 5.51 | 5.00 | 1.98 | 1.65 | 27.81 | 21.00 | 2294 |
| 9.31 | 9.00 | 2.08 | 11.39 | 10.00 | 7.14 | ...... | 7.14 | 7.00 | .96 | .82 | 26.53 | 26.00 | 1172 |
| 7.10 | 7.00 | 1.17 | 8.27 | 8.00 | 1.32 | ...... | 1.32 | 1.00 | 1.00 | .82 | 18.09 | 18.00 | 3361 |
| 8.63 | 8.00 | 1.28 | 9.91 | 9.00 | 1.40 | ...... | 1.40 | 1.00 | .98 | .82 | 19.81 | 17.00 | 2924 |
| *8.20 | 9.00 | 6.04 | 14.24 | 14.00 | 1.76 | ...... | *1.76 | 2.50 | 2.16 | 1.85 | 27.26 | 23.00 | 3039 |
| 7.95 | 8.00 | 1.87 | 9.82 | ...... | 1.40 | ...... | 1.40 | 1.00 | .94 | .82 | 19.16 | 22.00 | 2509 |
| 9.87 | 9.00 | .93 | 10.80 | ...... | 3.09 | ...... | 3.09 | 3.00 | .86 | .82 | 21.98 | 18.00 | 3318 |
| 7.95 | 8.00 | .79 | 8.74 | ...... | 2.87 | ...... | 2.87 | 2.00 | .96 | .82 | 20.13 | 18.00<br>16.00 | 2911<br>3332 |
| 8.01 | 8.00 | 1.12 | 9.13 | ...... | 3.75 | ...... | 3.75 | 3.00 | 1.64 | 1.65 | 24.46 | 22.50 | 3372 |
| 8.77 | 8.00 | .45 | 9.22 | ...... | 5.14 | ...... | 5.14 | 4.00 | .86 | .82 | 22.68 | 20.00 | 2516 |
| 9.69 | 8.00 | .38 | 10.07 | ...... | 5.88 | ...... | 5.88 | 5.00 | *1.24 | 1.65 | 23.24 | 23.00 | 2515 |
| 7.33 | 6.00 | .89 | 8.22 | ...... | 5.40 | ...... | 5.40 | 3.00 | 1.07 | 1.07 | 20.18 | 20.00 | 2293 |
| 8.87 | 9.00 | 1.79 | *10.66 | 11.00 | 3.42 | ...... | 3.42 | 3.00 | 1.58 | 1.43 | 25.05 | 25.00 | 3285 |
| *7.66 | 9.00 | 2.80 | *10.46 | 11.00 | 1.20 | 1.69 | 2.89 | 1.50 | 1.61 | 1.43 | 24.21 | 23.00 | 2329 |
| 8.59 | 7.00 | 6.72 | 15.31 | 14.00 | 1.07 | 2.35 | 3.42 | 3.00 | 2.90 | 2.46 | 32.84 | 29.00 | 2323 |
| 7.05 | 7.00 | 1.02 | 8.07 | 8.00 | 1.99 | ...... | 1.39 | 1.50 | .76 | .41 | 17.53 | 18.65<br>16.00<br>...... | 2680<br>2350<br>2742 |
| 8.41 | 8.00 | 1.50 | 9.91 | 9.00 | 3.92 | ...... | 3.92 | 4.00 | 1.60 | 1.65 | 24.97 | 21.00 | 2312 |
| 6.67 | 6.00 | 4.96 | 11.63 | 11.00 | 9.24 | ...... | 9.24 | 5.00 | *1.39 | 1.65 | 26.83 | 26.50 | 3434 |
| 6.37 | ...... | 5.62 | 11.99 | 7.00 | 8.96 | ...... | 8.96 | 4.00 | 1.72 | .82 | 30.50 | 24.50 | 3433 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | THE RAMSBURG FERTILIZER CO., FREDERICK, MD. | | |
| 2896 | Excelsior Plant Food, | Humbret & Krug, Littlestown, | 12.65 |
| 2897 | Queen, | Humbret & Krug, Littlestown, | 10.48 |
| | RASIN-MONUMENTAL CO., BALTIMORE, MD. | | |
| 2825 | †Rasin's Best Wheat and Grass Producer, | W. H. Krebs, Madisonburg, | 10.90 |
| 3025 | | W. H. Walker & Co., Kennett Square. | |
| 67 | Rasin's General Tobacco Grower, | L. A. Geiger, Joanna, | 9.65 |
| 861 | Rasin's Indian Brand for Tobacco, | Elias S. Brubacher, Richland, | 8.85 |
| 3220 | Rasin's United Grain Grower, | Geo. Bottorff, Freeburg, | 12.88 |
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 2780 | †Reading All Crop Special, | Frank Sheirer, Slatington, | 8.15 |
| 2506 | | Silas M. Yerkes, Newtown, | |
| 2843 | | John Gerhart, Mifflintown, | |
| 2370 | †Blood, Meat and Potash Mixture, | Victor Denny, Cresson, | 7.98 |
| 2830 | | J. W. Zeigler, Rebersburg, | |
| 2372 | Farmers' Union Fertilizer, | Victor Denny, Cresson, | 10.20 |
| 2521 | †Reading Special Grain and Grass Producer. | W. W. Moses, Exton, | 6.75 |
| 2274 | | Grover C. Myers, Gardners, | |
| 2582 | | C. H. Weber, Rehresburg, | |
| 2828 | †Schuylkill Valley Favorite for Grain and Grass. | A. J. Stover, Coburn, | 7.85 |
| 2670 | | Adam Kunkle, Little Gap, | |
| 3300 | | H. J. Buck, Ebensburg, | |
| 2507 | †Truck, Fruit Tree, Vine, Potato and Tobacco Grower. | Silas M. Yerkes, Newtown, | 6.90 |
| 3058 | | S. M. Kline, Lebanon, R. No. 4, | |
| | J. G. REICHARD & BRO., ASHLAND, PA. | | |
| 2777 | Surpass Phosphate, | John Fromm, Schuylkill Haven, | 9.08 |
| | ROBERT A. REICHARD, ALLENTOWN, PA. | | |
| 3685 | Little Giant Phosphate, | Kemmer & Co., Lehighton, | 4.83 |
| 2643 | Surpass Phosphate, | Jas. Wolf, Kriedersville, | 5.78 |
| | REINDOLLAR CO., TAWNEYTOWN, MD. | | |
| 704 | Economy Fertilizer, | Littlestown Milling Co., Littlestown, | 5.10 |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 2332 | †Royster's Ammoniated Potash Compound, | Eicher & Graft, Scottdale, | 9.08 |
| 2299 | | Harry Zipp, New Oxford, | |
| 2809 | | D. R. Foreman, Centre Hall | |
| 2400 | Royster's Corn and Hop Special Fertilizer, | A. W. Williams, Factoryville, | 13.13 |
| 2479 | Royster's Fish, Flesh and Fowl, | A. B. Mendenhall, Benton, R. No. 5, | 8.08 |
| 2478 | Royster's Good Cheer Brand, | A. B. Mendenhall, Benton, R. No. 5, | 8.05 |
| 933 | †Royster's Great Grain Grower, | Weaver & Berkey, Windber, | 8.85 |
| 130 | | Abraham Hostetler, Johnstown, R. No. 3. | |
| 1199 | | John H. Strickler, Mifflinburg, | |
| 2437 | †Royster's Imperial Formula, | N. C. Creasy, Catawissa, | 9.06 |
| 2408 | | E. K. Owens, Susquehanna, | |
| 2757 | | Chas. Baer, Allentown, R. D., | |
| 3241 | Royster's Seeding Down Special Fertilizer, | F. H. Clemson, Stormstown, | 9.08 |
| | SCHAAL-SHELDON FERTILIZER CO., BUFFALO, N. Y. | | |
| 2627 | Complete Fertilizer with Extra Potash, | Geo. Deitch, Carlisle, R. No. 9, | 10.00 |
| 2625 | Farmers' Favorite, | Geo. Deitch, Carlisle, R. No. 9, | 11.60 |
| 2950 | Superior, | C. F. Beck, York, R. No. 9, | 11.10 |

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†Composite sample.

## LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 10.14 | 9.00 | 3.76 | 13.90 | ...... | 2.12 | ...... | 2.12 | 2.00 | *1.43 | 1.65 | 25.32 | 20.00 | 2896 |
| 9.58 | 8.00 | 4.75 | 14.33 | ...... | 1.13 | ...... | *1.13 | 2.00 | .50 | .41 | 16.48 | 15.50 | 2897 |
| 8.51 | 8.00 | 2.42 | 10.93 | 9.00 | 3.24 | ...... | 3.24 | 3.00 | 1.31 | 1.23 | 23.52 | 19.80<br>23.50 | 2825<br>3025 |
| 7.84 | 8.00 | 3.35 | 11.19 | 9.00 | 3.36 | ...... | 3.36 | 3.00 | 1.76 | 1.65 | 25.41 | 22.00 | 67 |
| 7.85 | 8.00 | 3.52 | 11.37 | 9.00 | 4.15 | ...... | 4.15 | 3.00 | *2.24 | 2.47 | 28.58 | 24.56 | 861 |
| 8.51 | 8.00 | 2.80 | 11.31 | 9.00 | 2.21 | ...... | 2.21 | 2.00 | 1.02 | .82 | 21.22 | 18.00 | 3220 |
| 7.10 | 7.00 | 1.73 | 8.83 | 8.00 | 4.98 | ...... | 4.98 | 5.00 | 1.61 | 1.64 | 29.96 | 27.00<br>28.00<br>...... | 2780<br>2506<br>2843 |
| 8.20 | 8.00 | 1.17 | 9.37 | 9.00 | 2.43 | ...... | 2.43 | 2.00 | 1.63 | 1.64 | 23.34 | 25.00<br>24.00 | 2370<br>2830 |
| 8.76 | 8.00 | .69 | 9.45 | 9.00 | 8.15 | ...... | 8.15 | 8.00 | 1.71 | 1.64 | 27.02 | 30.00 | 2372 |
| *6.80 | 7.00 | 1.43 | 8.23 | 8.00 | 3.60 | ...... | 3.60 | 3.00 | .89 | .82 | 19.81 | 22.00<br>18.00<br>19.00 | 2521<br>2274<br>2582 |
| 6.92 | 7.00 | 1.05 | 7.97 | 8.00 | 1.97 | ...... | *1.97 | 2.00 | .43 | .41 | 15.99 | 18.00<br>17.00<br>19.00 | 2823<br>2670<br>3300 |
| *7.69 | 8.00 | 2.01 | 9.70 | 9.00 | 5.73 | 1.65 | 7.38 | 7.00 | 3.81 | 3.29 | 36.21 | 39.00<br>32.00 | 2507<br>3058 |
| 9.49 | 8.00 | 2.26 | 11.75 | 10.00 | 2.37 | ...... | 2.37 | 2.00 | 1.63 | 1.64 | 25.10 | 23.00 | 2777 |
| *6.76 | 7.00 | 3.12 | 9.88 | 8.50 | 1.51 | ...... | 1.51 | 1.00 | 1.07 | .82 | 19.15 | 19.00 | 3085 |
| *7.72 | 8.00 | 2.01 | *9.73 | 10.00 | 2.89 | ...... | 2.89 | 2.00 | 1.64 | 1.64 | 23.76 | 17.50 | 2643 |
| 8.41 | 8.00 | 2.77 | 11.18 | ...... | 4.42 | ...... | 4.42 | 4.00 | 1.12 | .82 | 23.84 | 17.00 | 704 |
| 9.12 | 9.00 | 1.36 | 10.48 | 9.50 | 6.75 | ...... | *6.75 | 7.00 | .96 | .82 | 25.60 | 25.00<br>21.50<br>22.60 | 2332<br>2299<br>2809 |
| 8.48 | 8.00 | .51 | 8.99 | 8.50 | 3.57 | ...... | 3.57 | 3.00 | 2.36 | 2.06 | 27.66 | 24.00 | 2400 |
| 8.03 | 8.00 | 1.19 | 9.22 | 8.50 | 3.13 | ...... | 3.13 | 3.00 | 1.68 | 1.65 | 24.13 | 23.50 | 2479 |
| 8.10 | 8.00 | 1.17 | 9.27 | 8.50 | 2.33 | ...... | 2.33 | 2.00 | 1.20 | 1.03 | 21.09 | 20.00 | 2478 |
| 8.01 | 8.00 | 1.70 | 9.71 | 8.50 | 5.94 | ...... | 5.94 | 5.00 | .98 | .82 | 24.01 | 21.00<br>21.00<br>18.00 | 933<br>130<br>1199 |
| 8.15 | 8.00 | 1.12 | 9.27 | 8.50 | 4.05 | ...... | 4.05 | 4.00 | .81 | .82 | 21.02 | 19.00<br>20.00<br>21.00 | 2437<br>2408<br>2757 |
| 8.96 | 9.00 | 1.11 | 10.07 | 9.50 | 4.00 | ...... | 4.00 | 8.00 | .94 | .82 | 22.47 | ........ | 3241 |
| 8.67 | 8.00 | 1.53 | 10.20 | 9.00 | 7.47 | 2.65 | 10.12 | 10.00 | 1.77 | 1.65 | 32.88 | ........ | 2627 |
| 8.66 | 8.00 | 1.28 | 9.94 | 9.00 | 1.94 | ...... | 1.94 | 2.00 | 1.03 | .82 | 20.62 | ........ | 2625 |
| 8.03 | 7.00 | .74 | 8.77 | 8.00 | 6.00 | 2.54 | *8.54 | 9.00 | .98 | .82 | 26.84 | 18.90 | 2950 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | THE SCOTT FERTILIZER CO., ELKTON, MD. | | |
| 3100 | †Grain Special, | Richard Vogel, Bethlehem, | 6.73 |
| 3381 | †Standard Phosphate, | E. D. Houser, Grantville, R. No. 2, | 7.58 |
| 3003 | | W. H. Diehl, Northumberland, | |
| 3101 | | Richard Vogel, Bethlehem, | |
| 3380 | Sure Crop Grower, | E. D. Houser, Grantville, R. No. 2, | 9.28 |
| 3173 | Wheat and Grass Grower, | Levi Beiler, Elverson, R. No. 3, | 7.06 |
| | M. L. SHOEMAKER & CO., LTD., PHILADELPHIA, PA. | | |
| 2761 | Good Enough Super Phosphate, | W. E. Rhine, Rock, | 9.08 |
| 3166 | †Shoemaker's New Jersey Special for Wheat and Clover. | Jas. Melcher, Barto, R. No. 1, | 8.15 |
| 3422 | | Sheets & Price, Quakertown, | |
| 3416 | †Shoemaker's Swift Sure Guano for Fall Trade. | Harry Frego, Pineville, | 10.33 |
| 3375 | | Jas. Shaeffer, Swatara, | |
| 3442 | | P. S. Schappell, Mohrsville, | |
| | F. A. SIMONS, CORNWELLS, PA. | | |
| 3408 | The Farmers' Favorite High Grade Phosphate for Truck and Corn. | F. A. Simons Est., Cornwells, | 11.25 |
| 3407 | The Farmers' High Grade Phosphate for General Use. | F. A. Simons Est., Cornwells, | 6.98 |
| | H. H. SMYSER, YORK, PA. | | |
| 2930 | Ammoniated Chicago Bone Tankage, | H. H. Smyser, York, | 10.88 |
| | FOR THE SOUTHERN FERTILIZING CO., AM. AG. CHEM. CO. | | |
| 2654 | †Southern Fertilizing Co., Ammoniated Dissolved Fertilizer. | Lovine Lerch, Bethlehem, R. D., | 11.28 |
| 2963 | | J. Emanuel Smith, York, | |
| 2653 | Southern Fertilizing Co. Farmers' Choice Brand. | Lovine Lerch, Bethlehem, | 9.83 |
| 2751 | Southern Fertilizing Co., General Crop Grower. | Peter Bear, Breinigsville, | 11.40 |
| | STANDARD GUANO CO., BALTIMORE, MD. | | |
| 3011 | †Standard Farmers' Champion, | Walter & Frederick, Montandon, | 7.69 |
| 3222 | | F. A. Bingamon, Port Trevorton, | |
| 1320 | Standard Farmers' Favorite, | H. H. Loose, Menges Mills, | 7.23 |
| 2460 | Standard Fish and Potash Guano, | A. W. Eves, Iola, | 9.85 |
| 2912 | †Standard Great Grain Grower, | H. H. Loose, Menges Mills, | 9.93 |
| 2458 | | A. W. Eves, Iola, | |
| 3012 | | Walter & Frederick, Montandon, | |
| 3463 | Standard Keystone Brand, | S. Book & Bro., Quarryville, | 10.08 |
| 3010 | Mammoth Potato Grower, | Walter & Frederick, Montandon, | 9.78 |
| | SWIFT & CO., BALTIMORE, MD. | | |
| 2746 | †Swift's Special Potato Fertilizer, | Francis Baker, Everett, | 7.40 |
| 2569 | | B. F. Sheesley, Penbrook, | |
| 3187 | | Jas. Guldner, Tamaqua, R. No. 3, | |
| | I. P. THOMAS & SONS CO., PHILADELPHIA, PA. | | |
| 2491 | †Champion Phosphate, | B. F. Hipple, West Chester, | 10.06 |
| 2427 | | J. R. Kase, Elysburg, | |
| 2877 | | J. F. Grubb, Mifflinburg, | |
| 3197 | Farmers' Choice Phosphate, | Chas. Rarig, Drums, R. D., | 6.23 |
| 2259 | †Improved Super Phosphate, | A. J. Harbold, Bermudian, | 10.08 |
| 3376 | | Ed. Shuey, Lickdale, R. No. 1, | |
| 2428 | †Superior Super Phosphate, | J. R. Kase, Elysburg, | 10.25 |
| 2970 | | H. S. Amidon, Edinboro, | |
| 2714 | †Tip Top Super Phosphate, | Wm. Miller, Saulsburg, | 8.70 |
| 2399 | | Samuel Eggleston, Vernon, | |
| 2902 | | Good & Kline, Sells Station, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| *7.61 | 8.00 | 1.16 | 8.77 | ...... | 4.43 | ...... | 4.43 | 4.00 | .61 | .41 | 19.98 | 20.00<br>18.00 | 3100<br>3381 |
| 7.97 | 8.00 | 1.24 | 9.21 | ...... | 4.31 | ...... | 4.31 | 4.00 | .94 | .82 | 21.84 | ......<br>19.00 | 3008<br>3101 |
| 8.40 | 8.00 | 2.18 | 10.58 | ...... | 5.69 | ...... | 5.69 | 5.00 | 2.00 | 1.65 | 28.96 | 22.50 | 3380 |
| 8.25 | 8.00 | 1.15 | 9.40 | ...... | 2.83 | ...... | 2.83 | 2.00 | .48 | .41 | 15.94 | 15.00 | 3173 |
| 9.44 | 8.00 | 2.93 | 12.37 | 10.00 | 3.18 | ...... | 3.18 | 2.00 | 1.70 | 1.64 | 26.44 | 22.75 | 2761 |
| 9.59 | 8.00 | 3.42 | 13.01 | 10.00 | 2.62 | ...... | 2.62 | 2.00 | 1.56 | 1.09 | 25.54 | 21.00<br>22.00 | 3166<br>3422 |
| 9.07 | 8.00 | 2.49 | 11.56 | 11.00 | 5.78 | ...... | 5.78 | 5.00 | 1.91 | 1.65 | 29.41 | 24.00<br>32.00<br>...... | 3416<br>3375<br>3442 |
| 6.64 | 6.00 | .73 | *7.37 | 8.00 | 4.33 | ...... | 4.33 | 3.04 | 3.82 | 3.30 | 33.28 | 30.00 | 3406 |
| 8.43 | 7.00 | 1.98 | 10.41 | 9.50 | 4.13 | ...... | 4.13 | 3.06 | 2.15 | 2.04 | 27.99 | 25.00 | 3407 |
| 9.21 | 8.00 | 2.84 | 12.05 | 10.00 | 1.86 | ...... | 1.86 | 2.00 | .98 | .82 | 21.60 | 18.00 | 2930 |
| *9.64 | 10.00 | 1.85 | 11.49 | 11.00 | 2.73 | ...... | 2.73 | 2.50 | 1.81 | 1.65 | 26.14 | ......<br>24.00 | 2654<br>2963 |
| 9.19 | 9.00 | 1.77 | 10.96 | 10.00 | 2.39 | ...... | 2.39 | 2.00 | .91 | .82 | 21.18 | 20.00 | 2653 |
| 8.12 | 8.00 | 1.57 | 9.69 | 9.00 | 2.27 | ...... | 2.27 | 2.00 | .66 | .41 | 18.73 | 18.00 | 2751 |
| 8.73 | 8.00 | 1.07 | 9.80 | 8.50 | 2.62 | ...... | 2.62 | 2.00 | .80 | .41 | 20.13 | 16.00<br>16.00 | 3011<br>3222 |
| 8.78 | 8.00 | .68 | 9.46 | 8.50 | 4.04 | ...... | 4.04 | 3.00 | .66 | .41 | 20.76 | 17.00 | 1320 |
| 9.16 | 9.00 | 1.42 | 10.58 | 9.50 | 4.58 | ...... | 4.58 | 2.00 | 1.06 | .82 | 23.94 | 18.00 | 2460 |
| 8.45 | 8.00 | 1.05 | 9.50 | 8.50 | 5.00 | ...... | 5.00 | 4.00 | .97 | .82 | 22.95 | 19.00<br>19.00<br>18.00 | 2912<br>2458<br>3012 |
| 8.54 | 8.00 | 1.25 | 9.79 | 8.50 | 2.33 | ...... | 2.33 | 2.00 | .95 | .82 | 20.46 | 17.00 | 3463 |
| 7.90 | 8.00 | 1.74 | 9.64 | 8.50 | 9.60 | 1.56 | 11.16 | 10.00 | 1.78 | 1.64 | 33.26 | 26.00 | 3010 |
| 7.81 | 8.00 | .53 | *8.34 | 9.00 | 7.20 | 2.60 | *9.80 | 10.00 | 1.70 | 1.65 | 31.01 | 28.00<br>26.00<br>...... | 2746<br>2569<br>3187 |
| 8.98 | 8.00 | .59 | 9.57 | 9.00 | 4.41 | ...... | 4.41 | 4.00 | 1.84 | 1.64 | 26.77 | 24.00<br>22.00<br>21.50 | 2491<br>2427<br>2877 |
| *9.29 | 9.50 | 1.04 | 10.33 | 10.00 | 2.54 | ...... | 2.54 | 2.00 | 1.91 | 1.60 | 25.66 | 23.00 | 3197 |
| 8.94 | 9.00 | .56 | 9.50 | ...... | 2.51 | ...... | 2.51 | 2.00 | .89 | .82 | 20.46 | 19.00<br>18.50 | 2259<br>3376 |
| *6.61 | 7.00 | 1.20 | 7.81 | 8.00 | 1.60 | ...... | 1.60 | 1.00 | .89 | .82 | 17.44 | 18.00<br>21.00 | 2428<br>2970 |
| 8.80 | 8.00 | .48 | 9.28 | 9.00 | 4.42 | ...... | 4.42 | 4.00 | 2.69 | 2.46 | 30.42 | 24.00<br>22.00<br>26.25 | 2714<br>2399<br>2902 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | TRENTON BONE FERTILIZER CO., TRENTON, N. J. | | |
| 3392 | Trenton Grain and Grass, | Edward Garges, Doylestown, | 6.75 |
| 3036 | Trenton Grain Manure, | Edward Garges, Doylestown, | 9.05 |
| | F. W. TUNNELL & CO., PHILADELPHIA, PA. | | |
| 2490 | †Complete Superphosphate, | Ed. Brinton & Sons, West Chester, | 8.08 |
| 2789 | | J. W. Lay, New Tripoli, | |
| 2489 | †Potato and Grain Manure, | Ed. Brinton & Sons, West Chester, | 6.58 |
| 2788 | | J. W. Lay, New Tripoli, | |
| 3030 | Re-sieved Phosphate, | Geo. R. Watson, Embreeville, | 7.05 |
| | TUSCARORA FERTILIZER CO., BALTIMORE, MD. | | |
| 3007 | Crop Grower, | I. A. Eschbach, Milton, R. No. 1, | 7.23 |
| 3006 | †Big (4) Four, | I. A. Eschbach, Milton, R. No. 1, | 6.23 |
| 3193 | | Fred S. Nester, New Ringgold, | |
| | FOR J. E. TYGERT CO., PHILADELPHIA, PA., BY AM. AG. CHEM. CO. | | |
| 2792 | Popular Phosphate, | Robt. Schaffer, Summitt Station, | 10.75 |
| 2518 | †Standard Fertilizer, | H. W. McNair, Mechanicsville, | 11.43 |
| 3196 | | J. T. Davis, St. Johns, | |
| | UNION CHEMICAL WORKS, INC., NORTH WALES, PA. | | |
| 2575 | Animal Bone and Potash, | J. Swope, Myerstown, R. No. 5, | 4.45 |
| 3417 | †Farmers' Special, | Henry K. Mohr, Quakertown, | 8.63 |
| 2576 | | J. Swope, Myerstown, R. No. 5, | |
| 3445 | | J. Swope & Son, Myerstown, | |
| 3418 | General Crop Grower, | Henry K. Mohr, Quakertown, | 9.75 |
| 3419 | †Grain and Grass Grower, | Henry K. Mohr, Quakertown, | 9.03 |
| 2574 | | J. Swope, Myerstown, R. No. 5, | |
| 3444 | | J. Swope & Son, Myerstown, | |
| 420 | Grangers' Favorite, | Union Chemical Works, North Wales. | 10.65 |
| | THE UNITED STATES FERTILIZER CO., BALTIMORE, MD. | | |
| 2247 | †Farm Bell Buckeye Guano, | Cook Grain, Feed and Supply Co., Dillsburg. | 11.19 |
| 3082 | | C. L. Martin, Loysville, | |
| 3310 | Farm Bell Crop Producer, | J. A. Witherspoon, Mercersburg, | 8.45 |
| 2999 | †Farm Bell Grain Grower, | J. A. Gass, Sunbury, R. No. 3, | 8.15 |
| 2900 | | A. P. Lippy, Littlestown, | |
| 3309 | | J. A. Witherspoon, Mercersburg, | |
| 3107 | Farm Bell Klimax Kompound, | J. Henchman, Seigfried, | 8.43 |
| 3084 | Farm Bell Standard Guano, | H. C. Shearer, New Bloomfield, | 8.93 |
| | VIRGINIA CAROLINA CHEMICAL CO., RICMOND, VA. | | |
| 3172 | V. C. C. Co's. Special for Wheat and Grass. | L. A. Geiger, Joanna, | 9.83 |
| | J. C. WALKER & SONS CO., GAP, PA. | | |
| 3504 | Pride of Pequea Phosphate, | E. E. & M. J. Walker, Kinzer, | 9.08 |
| | W. E. WHANN CO., PHILADELPHIA, PA. | | |
| 3425 | Whann's Chester Valley Available Ammoniated Superphosphate. | Milton Johnston, Quakertown, | 8.33 |
| 2773 | †Whann's Chester Valley Fish and Potash Fertilizer. | Morris Bowen, Schuylkill Haven, | 10.35 |
| 3395 | | D. Arthur Gross, Danboro, | |
| 2768 | †Whann's Chester Valley No. 2 Ammoniated Superphosphate. | S. Else Schwahn, Valley View, | 9.85 |
| 3396 | | D. Arthur Gross, Danboro, | |
| 3397 | Whann's Chester Valley 10% Sweet Potato and Tomato Manure. | D. Arthur Gross, Danboro, | 8.83 |
| 2774 | †Whann's Special Ammoniated Superphosphate. | Morris Bowen, Schuylkill Haven, | 9.38 |
| 3424 | | Milton Johnston, Quakertown, | |

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†Composite sample.

LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| *7.16 | 8.00 | 2.76 | 9.92 | ...... | 11.86 | ...... | 11.36 | 10.00 | 2.10 | 2.06 | 34.17 | ........ | 3392 |
| *7.79 | 8.00 | 2.61 | 10.40 | ...... | 3.79 | ...... | 3.79 | 8.00 | 1.69 | 1.65 | 25.23 | ........ | 3036 |
| *7.45 | 8.00 | 1.99 | 9.44 | 9.00 | 3.02 | ...... | 3.02 | 1.75 | .90 | .82 | 20.12 | 23.00<br>20.00 | 2490<br>2789 |
| 6.88 | 7.00 | 1.74 | 8.62 | 8.00 | 5.63 | ...... | 5.63 | 4.00 | 1.46 | 1.64 | 26.88 | 27.00<br>23.00 | 2489<br>2788 |
| 5.87 | 6.00 | 1.79 | 7.66 | 7.00 | 3.02 | ...... | 3.02 | 1.00 | .78 | .41 | 17.94 | 20.00 | 3030 |
| *7.52 | 8.00 | 1.36 | 8.88 | 8.50 | 2.18 | ...... | 2.13 | 2.00 | .90 | .82 | 19.05 | 16.00 | 3007 |
| *6.60 | 7.00 | 2.15 | 8.75 | 7.50 | 4.48 | ...... | 4.48 | 4.00 | 1.70 | 1.65 | 24.51 | 20.25<br>22.00 | 3006<br>3193 |
| 7.65 | 7.00 | 2.46 | 10.11 | 8.00 | 2.96 | ...... | 2.96 | 1.00 | 1.20 | .82 | 21.86 | 18.50 | 2792 |
| 7.93 | 8.00 | 2.08 | 10.01 | 9.00 | 2.73 | ...... | 2.73 | 2.00 | 1.56 | 1.65 | 23.37 | 23.00<br>23.00 | 2518<br>3198 |
| 6.42 | ...... | 8.18 | 14.60 | 11.00 | 5.30 | ...... | 5.30 | 5.00 | 2.24 | 1.65 | 30.56 | 26.70 | 2575 |
| 8.09 | 8.00 | .93 | 9.02 | ...... | 4.11 | ...... | 4.11 | 4.00 | .97 | .82 | 21.62 | 21.00<br>18.75<br>20.25 | 3417<br>2576<br>3445 |
| 8.52 | 8.00 | .60 | 9.12 | ...... | 2.43 | ...... | 2.43 | 2.00 | .88 | .82 | 19.96 | 19.00 | 3418 |
| 8.44 | 8.00 | .96 | 9.40 | ...... | 4.40 | 1.88 | 6.28 | 6.00 | 1.69 | 1.65 | 28.11 | 26.00<br>23.70<br>25.00 | 3419<br>2574<br>3444 |
| 8.10 | 8.00 | .70 | 8.80 | ...... | 8.09 | ...... | 8.09 | 8.00 | 1.79 | 1.64 | 29.48 | ........ | 420 |
| 9.13 | 9.00 | .66 | *9.79 | 10.00 | 2.99 | ...... | 2.99 | 2.00 | 1.14 | .82 | 22.35 | 17.42<br>20.00 | 2247<br>3082 |
| 9.22 | 8.00 | 1.11 | 10.33 | 9.00 | 1.69 | ...... | 1.69 | 1.00 | 1.20 | .82 | 21.57 | 16.00 | 3310 |
| 8.01 | 8.00 | .51 | *8.52 | 9.00 | 2.46 | ...... | 2.46 | 2.00 | .61 | .41 | 18.08 | 20.00<br>16.50<br>15.25 | 2999<br>2900<br>3309 |
| 8.24 | 7.00 | .85 | 9.09 | 8.00 | 4.52 | ...... | 4.52 | 4.00 | 1.01 | .82 | 22.38 | 18.00 | 3107 |
| 8.54 | 8.00 | .80 | 9.34 | 9.00 | 2.91. | ...... | 2.91 | 2.00 | 1.76 | 1.65 | 24.45 | 19.00 | 3084 |
| 7.27 | 7.00 | 1.40 | 8.67 | 8.00 | 1.74 | ...... | *1.74 | 2.00 | .61 | .41 | 16.99 | 15.00 | 3172 |
| 9.83 | 10.00 | 2.51 | 12.34 | ...... | 3.30 | ...... | 3.30 | 3.00 | 2.31 | 2.46 | 26.25 | 25.00 | 3504 |
| 7.80 | 7.00 | 2.12 | 9.92 | 8.00 | 2.64 | ...... | *2.64 | 3.00 | 1.30 | 1.00 | 21.99 | ........ | 3425 |
| *7.78 | 8.00 | 1.94 | 9.72 | 9.00 | 3.98 | ...... | *3.98 | 5.00 | 1.44 | 1.48 | 23.96 | 25.00<br>25.50 | 2773<br>3395 |
| 7.40 | 7.00 | 2.13 | 9.53 | 8.00 | 2.76 | ...... | *2.76 | 3.00 | 1.17 | 1.25 | 21.01 | 21.60<br>22.50 | 2768<br>3396 |
| 6.86 | 5.00 | 1.16 | 8.02 | 6.00 | 10.19 | ...... | 10.19 | 10.00 | 1.74 | 1.65 | 30.32 | 23.00 | 3397 |
| 8.09 | 7.50 | 2.01 | 10.10 | 8.50 | 2.02 | ...... | 2.02 | 2.00 | .96 | .82 | 20.00 | 20.00<br>...... | 2774<br>3424 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **WOOLDRIDGE FERTILIZER CO., BALTIMORE, MD.** | | |
| 2415 | †Woolridge's Clover Leaf Crop Grower, | Grant Johnston, Millvale, | 10.23 |
| 2590 | | Briner & Jackson, Carlisle, | |
| 3450 | Woolridge's Cyclone, | E. O. Hacker, Lincoln, | 8.08 |
| 2456 | †Woolridge's High Grade Potato and Tomato Grower. | Grant Johnson, Millville, | 8.93 |
| 3451 | | E. O. Hacker, Lincoln, | |
| 3449 | †Wooldridge's Old Hickory Phosphate, | E. O. Hacker, Lincoln, | 8.95 |
| 2455 | | Grant Johnson, Millville, | |
| 2591 | | Briner & Jackson, Carlisle, | |
| | **ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD.** | | |
| 3170 | Double Quick Phosphate, | O. G. Yenser, Elverson, R. D., | 10.92 |
| | **YORK CHEMICAL WORKS, YORK, PA.** | | |
| 2711 | †Dempwolf's Ammoniated R. B., | J. H. Edmiston, Petersburg, R. D., | 8.78 |
| 2494 | | Thos. Haines & Co., Malvern, | |
| 2371 | | Peter Remer & Son, Mifflinburg, | |
| 2251 | Dauphin Brand, | J. B. Spera, Dillsburg, | 8.15 |
| 3158 | †Dempwolf's Half and Half, | Emanuel Berkley, Rehresburg, | 8.18 |
| 2375 | | M. J. Bradley, Cresson, | |
| 3337 | | A. C. Hartman, Dillsburg, | |
| 2496 | †Dempwolf's Plow Brand, | Thos. Haines & Co., Aldham, | 7.85 |
| 3111 | | John S. Hashberger, Everett, | |
| 1782 | Special Mixture, | Jackson & Crispin, Berwick, | 5.98 |
| 2873 | †Dempwolf's Spring Special, | Peter Renner & Son, Mifflinburg, | 6.45 |
| 3183 | | Jonathan Kistler, Tamaqua, | |
| 2763 | †Dempwolf's Standard, | S. K. Savidge, Valley View, | 7.13 |
| 2495 | | Thos. Haines & Co., Malvern, | |
| 2952 | | J. R. W. Keesey, Stewartstown, | |
| 2916 | Strayers' Special Wheat and Corn, | Strayer Bros. Co., York, | 6.75 |
| | **HENRY S. ZOOK, ELVERSON, PA.** | | |
| 2525 | No. 5 Pride of Chester Corn, Oats and Wheat Phosphate. | J. P. Stoltzfus, Elverson, | 7.30 |
| 2524 | No. 6, Pride of Chester Phosphate for General Use. | J. P. Stoltzfus, Elverson, | 7.98 |

†Composite sample.

## LIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| 8.82 | 8.00 | .54 | 8.86 | 8.50 | 2.36 | ...... | 2.36 | 2.00 | .64 | .42 | 18.50 | 16.00<br>18.00 | 2415<br>2590 |
| 8.44 | 8.00 | .77 | 9.21 | 8.50 | 2.93 | ...... | 2.93 | 3.00 | 2.54 | 2.47 | 28.02 | 25.50 | 2450 |
| *7.94 | 9.00 | .81 | *8.75 | 9.50 | 5.10 | ...... | 5.10 | 5.00 | 1.79 | 1.64 | 26.31 | 24.00<br>25.00 | 2456<br>3451 |
| 8.19 | 8.00 | .87 | 9.06 | 8.50 | 2.21 | ...... | 2.21 | 2.00 | 1.25 | 1.08 | 21.12 | 19.00<br>18.00<br>19.75 | 3449<br>2455<br>2591 |
| 9.69 | 9.00 | 2.01 | 11.70 | 10.00 | 3.13 | ...... | 3.13 | 3.00 | *1.93 | 2.26 | 27.37 | ........ | 3170 |
| *9.44 | 10.00 | 5.13 | 14.57 | 11.00 | 4.15 | ...... | 4.15 | 4.00 | 2.04 | 1.65 | 30.07 | ......<br>28.00<br>25.75 | 2711<br>2494<br>2871 |
| 10.01 | 10.00 | 1.34 | 11.35 | 10.50 | 2.60 | ...... | 2.60 | 2.00 | 1.29 | 1.23 | 23.83 | 22.00 | 2251 |
| 6.95 | 7.00 | 1.21 | 8.16 | 7.50 | 1.37 | ...... | 1.37 | 1.00 | 1.12 | .82 | 18.40 | ......<br>19.00<br>17.00 | 3158<br>2375<br>3337 |
| 8.04 | 8.00 | .78 | 8.82 | 9.00 | 2.09 | ...... | 2.09 | 2.00 | 1.80 | 1.65 | 23.32 | 23.00<br>22.00 | 2496<br>3111 |
| 9.99 | 9.00 | 1.43 | 11.42 | 9.50 | 3.57 | ...... | 3.57 | 3.00 | .87 | .82 | 22.77 | ........ | 1782 |
| 7.30 | 7.00 | .73 | 8.03 | 8.00 | 10.25 | ...... | 10.25 | 10.00 | 2.11 | 1.65 | 32.24 | 27.50<br>...... | 2873<br>3183 |
| 8.39 | 8.00 | .73 | 9.12 | 9.00 | 5.66 | ...... | 5.56 | 5.00 | 1.68 | 1.65 | 26.82 | 28.25<br>25.00<br>22.50 | 2763<br>2495<br>2952 |
| 8.46 | 8.00 | 1.31 | 9.77 | 8.50 | 2.52 | ...... | 2.52 | 2.00 | .98 | .87 | 20.76 | 17.50 | 2916 |
| 10.20 | 10.00 | 1.50 | 11.70 | 11.00 | 2.23 | ...... | 2.23 | 2.00 | .52 | .41 | 16.86 | 18.00 | 2525 |
| 8.40 | 8.00 | .65 | 9.05 | 9.00 | 3.34 | ...... | 3.34 | 3.00 | 1.34 | 1.23 | 22.86 | 22.50 | 2524 |

*Constituent falls below guaranty.

## ROCK AND POTASH

### Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | **ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA.** | | |
| 3105 | High Grade Phosphate and Potash, .......... | Grant Lutz, Seigfrieds, .............. | 9.40 |
| | **AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.** | | |
| 2344 | †Big Crop Phosphate, ...................... | A. B. Mock, Martinsburg, ........... | 7.53 |
| 2263 | | Geo. E. Deitrick, York Springs, ... | |
| 2347 | | Irwin M. Ebersole, New Enterprise, | |
| 2248 | †Boss Potash Fertilizer, .................. | Jas Jacobs, York Springs, ........ | 8.73 |
| 2433 | | J. N. Getz Co., Lock Haven, ........ | |
| 3503 | Herr's Special Compound, .................... | Willis C. Herr, Strasburg, .......... | 10.08 |
| 2674 | †Penn Alkaline Phosphate, ................ | David Green, Little Gap, .......... | 8.65 |
| 2249 | | Jas. Jacobs, York Springs, .......... | |
| 3125 | | E. L. Griest, Cessner, .............. | |
| 3455 | Shuler's Phosphate and Potash, ............ | Adam Huntzinger, Blainsport, ..... | 9.70 |
| 3048 | Superior Potash Mixture, .................... | W. M. Woods, Huntsdale, .......... | 9.83 |
| 2348 | †Canton Chemical Soluble Phosphate and Potash. | Irwin M. Ebersole, New Enterprise, | 9.73 |
| 2340 | | King Bros., Uniontown, ............ | |
| 2763 | | H. L. Orr, Tyrone, .................. | |
| 644 | Clark's Cove Triumph Phosphate and Potash | Isaac M. Sheets, Sunbury, R. No. 3, | 8.55 |
| 3351 | †Detrich's Soluble Phosphate and Potash, | J. D. Coldsmith, Williamson, ........ | 10.03 |
| 3306 | | Levi Berkey, Somerset, ............ | |
| 3359 | | F. A. Wahl, R. D., Duncannon, ... | |
| 3095 | East India Farm Favorite, ................ | Madison Lehr, Nazareth, ............ | 9.95 |
| 2676 | East India Great Crop, ...................... | Theo. Gerhart, Gilbert, ............ | 11.38 |
| 2304 | Lazaretto High Grade Dessolved Phosphate and Potash. | W. T. Spangler, East Berlin, ..... | 10.65 |
| 2360 | †Maryland Bono Super Phosphate, ........ | J. F. Brenaman, Williamsburg, ..... | 9.75 |
| 3380 | | I. S. Sullenberger & Son, Fayetteville, | |
| 3358 | Maryland Linden Super Phosphate, ......... | Allen Thompson, R. No. 4, Duncannon. | 11.33 |
| 2731 | †Moro Phillips Great Crop Fertilizer, ... | C. E. Starr, Three Springs, ......... | 7.65 |
| 2616 | | Lowery Smith, R. No. 2, Newville, | |
| 2920 | | Zinn Bros., York, ..................... | |
| 2606 | †Moro Phillips Wheat Special, .......... | Nickles & Stewart, Shippensburg,.. | 9.73 |
| 2732 | | C. E. Starr, Three Springs, ........ | |
| 2266 | †Northwestern XXX Alkaline Phosphate,.. | T. E. Comfort, Bermudian, .......... | 9.43 |
| 3264 | | C. L. Shipman, Hughesville, ........ | |
| 2353 | Packer's Union Banner Wheat Grower, ... | H. N. Dilling, Martinsburg, ........ | 6.95 |
| 2430 | Quinnippiac Dissolved Phosphate and Potash | C. A. Williams, Blanchard, ......... | 8.73 |
| 2395 | †Read's Ten and Eight, ..................... | Billing Keldar, New Albany, ........ | 10.53 |
| 2839 | †Reese's Grass and Grain, ................. | W. V. Shirk, Oakland Mills, ...... | 11.65 |
| 2772 | | Harry Keefer, Pine Grove, ......... | |
| 2572 | | A. G. Houtz, Myerstown, ........... | |
| 2994 | | J. K. Hetrick, Sunbury, R. No. 3, | |
| 3273 | †Reese's Wheat Special, .................. | Jas. C. Hayes, Mackeyville, ....... | 10.28 |
| 3162 | | Sam'l Hummell, Monteray, ........ | |
| 3357 | | Allan Thompson, Duncannon, R. No. 4. | |
| 2612 | †Susquehanna Alkaline Phosphate, ........ | C. A. Fogelsonger, Shippensburg, | 10.43 |
| 2250 | | Jas. Jacobs, York Springs, ........ | |
| 2745 | | Francis Baker, Everett, ............ | |
| 2705 | †Susquehanna Grain and Grass Producer, | J. C. Mierley, Alexandria, .......... | 10.33 |
| 3218 | | Geo. R. Hendricks & Sons, Selins-Grove. | |
| 2500 | Wheeler's Fruit and Grain Grower, ....... | B. F. Bertolet, Anselina, .......... | 10.03 |
| 3152 | Wheeler's High Grade Phosphate and Potash | Jas. G. Horn, Scenery Hill, R. No. 3, | 9.78 |
| 3150 | †Wheeler's Wheat and Clover Fertilizer, | Jas. G. Horn, Scenery Hill, R. No. 3. | 10.30 |
| 2737 | | B. F. Whitesel, Saltillo, .......... | |
| 3272 | | J. A. Gummo, Mill Hall, R. No. 1, | |
| 2482 | Williams' & Clark's Defiance Phosphate... | Zehner Bros., Bloomsburg, .......... | 9.98 |
| 2462 | Williams' & Clark's Fruit Tree Invigorator, | Zehner Bros., Bloomsburg, .......... | 10.65 |

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†Composite sample.

# FERTILIZERS.

## Acid and Potash.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| *7.13 | 12.00 | 3.17 | *10.30 | 13.00 | 4.63 | ...... | *4.63 | 6.00 | 15.43 | ........ | 3105 |
| 8.31 | 8.00 | .55 | 8.86 | 9.00 | 5.62 | ...... | 5.62 | 5.00 | 16.29 | 16.00<br>15.50<br>15.00 | 2344<br>2263<br>2347 |
| 8.62 | 8.00 | .31 | 8.93 | 9.00 | 5.60 | ...... | 5.60 | 5.00 | 16.45 | 16.45<br>17.00 | 2248<br>2433 |
| 10.42 | 10.00 | 2.39 | 12.81 | 11.00 | 8.00 | ...... | 8.00 | 8.00 | 20.91 | 21.00 | 3503 |
| 6.50 | 6.00 | .74 | 7.24 | 7.00 | 4.15 | ...... | 4.15 | 3.00 | 13.59 | 18.00<br>14.28<br>13.00 | 2674<br>2249<br>3125 |
| 8.73 | 8.00 | 1.44 | 10.17 | 9.00 | 2.25 | ...... | 2.25 | 2.00 | 13.50 | 15.00 | 3455 |
| 13.28 | 13.00 | .54 | 13.82 | 14.00 | 6.17 | ...... | 6.17 | 6.00 | 20.43 | ........ | 3048 |
| 10.44 | 10.00 | .57 | 11.01 | 11.00 | 2.71 | ...... | 2.71 | 2.00 | 14.89 | 13.00<br>18.00<br>...... | 2348<br>2340<br>2703 |
| 10.34 | 10.00 | .80 | 11.14 | 11.00 | 2.29 | ...... | 2.29 | 2.00 | 14.49 | 15.00 | 644 |
| 9.96 | 10.00 | .65 | *10.61 | 11.00 | 2.64 | ...... | 2.64 | 2.00 | 14.50 | 12.75<br>14.00<br>13.50 | 3351<br>3306<br>3359 |
| 10.04 | 10.00 | 1.27 | 11.31 | 11.00 | 7.94 | ...... | 7.94 | 8.00 | 20.20 | ........ | 3095 |
| *7.60 | 8.00 | 1.93 | 9.53 | 9.00 | 4.96 | ...... | 4.96 | 5.00 | 15.63 | 16.00 | 2676 |
| 12.39 | 12.00 | .54 | 12.93 | 13.00 | 5.18 | ...... | 5.18 | 5.00 | 18.84 | 18.00 | 2304 |
| 10.08 | 10.00 | .68 | *10.76 | 11.00 | 2.40 | ...... | 2.40 | 2.00 | 14.36 | 15.00<br>12.50 | 2360<br>3330 |
| 11.71 | 11.00 | .42 | 12.13 | 12.00 | 2.46 | ...... | 2.46 | 2.00 | 15.50 | ........ | 3358 |
| 8.45 | 8.00 | .41 | 8.86 | 9.00 | 5.00 | ...... | 5.00 | 5.00 | 15.73 | 13.50<br>18.00<br>15.00 | 2731<br>2616<br>2920 |
| 10.06 | 10.00 | .47 | *10.53 | 11.00 | 2.57 | ...... | 2.57 | 2.00 | 14.44 | 14.00<br>12.50 | 2606<br>2732 |
| 10.00 | 10.00 | .73 | *10.73 | 11.00 | 5.60 | ...... | 5.60 | 5.00 | 17.59 | 15.00<br>18.00 | 2266<br>3264 |
| 10.25 | 10.00 | .48 | *10.73 | 11.00 | 2.29 | ...... | 2.29 | 2.00 | 14.31 | 13.50 | 2353 |
| 9.97 | 10.00 | .42 | *10.39 | 11.00 | 2.48 | ...... | 2.48 | 2.00 | 14.30 | 17.00 | 2430 |
| 10.01 | 10.00 | .80 | 10.81 | 11.00 | 8.30 | ...... | 8.30 | 8.00 | 20.36 | 22.00<br>...... | 2395<br>2839 |
| 9.92 | 10.00 | 1.21 | 11.13 | 11.00 | 2.16 | ...... | 2.16 | 2.00 | 14.19 | 14.00<br>15.00<br>15.00 | 2772<br>2572<br>2994 |
| 9.85 | 10.00 | .76 | *10.61 | 11.00 | 2.58 | ...... | 2.58 | 2.00 | 14.42 | 15.00<br>......<br>...... | 3273<br>3162<br>3357 |
| 10.40 | 10.00 | .38 | *10.78 | 11.00 | 2.49 | ...... | 2.49 | 2.00 | 14.44 | 14.00<br>15.25<br>15.00 | 2612<br>2250<br>2745 |
| 12.10 | 12.00 | .65 | *12.75 | 13.00 | 3.45 | ...... | 3.45 | 3.00 | 16.87 | 16.00<br>19.00 | 2705<br>3218 |
| 10.19 | 10.00 | 1.26 | 11.45 | 11.00 | 7.85 | ...... | 7.85 | 8.00 | 20.20 | ........ | 2500 |
| 12.06 | 12.00 | .92 | 12.98 | 13.00 | 5.36 | ...... | 5.36 | 5.00 | 18.90 | 22.00 | 3152 |
| 10.16 | 10.00 | .91 | 11.07 | 11.00 | 2.33 | ...... | 2.33 | 2.00 | 14.43 | 18.00<br>15.00<br>15.00 | 3150<br>2737<br>3272 |
| 12.24 | 12.00 | .73 | 12.97 | 13.00 | 5.16 | ...... | 5.16 | 5.00 | 18.73 | 18.00 | 2482 |
| 10.19 | 10.00 | 1.05 | 11.24 | 11.00 | 7.62 | ...... | *7.62 | 8.00 | 19.88 | 20.00 | 2462 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | | |
| 1689 | Double Dissolved Phosphate and Potash,.. | J. D. Coldsmith, Williamson, ....... | 9.10 |
| 187 | Double Extra Phosphate and Potash, ....... | J. H. Neidhigh, State College, ..... | 10.43 |
| 2815 | †American Formula Wheat and Corn, ... | John H. Neidhigh, State College, ... | 9.50 |
| 2306 | | A. D. Brown, East Berlin, ........ | |
| 3355 | | J. D. Coldsmith, Williamson, ....... | |
| | ARMOUR FERTILIZER WORKS, BALTIMORE. | | |
| 3491 | Armour's Phosphate and Potash, .......... | J. C. Walker & Sons Co., Gap, ..... | 11.90 |
| 2356 | †Armour's Wheat and Clover, ............ | C. A. Boyer, Roaring Springs, ..... | 10.48 |
| 2328 | | A. J. Steele, Latrobe, ............. | |
| 2413 | | Grant Johnson, Millville, .......... | |
| | ATLANTIC FERTILIZER CO., BALTIMORE, MD. | | |
| 3349 | Atlantic Farmers Alkaline Mixture, ........ | S. F. Peckman, Williamson, ....... | 8.70 |
| | R. S. AUKER, SHAMOKIN, PA. | | |
| 3214 | Economy Potash Phosphate, ................. | Geo. R. Hendricks & Son, Selinsgrove. | 6.93 |
| | BALTIMORE PULVERIZING CO., BALTIMORE, MD. | | |
| 2597 | †Corn and Grain Grower, ................. | J. A. Handshew, Shippensburg, ... | 8.35 |
| 2256 | | L. E. Speck, Wellsville, ........... | |
| 3334 | | J. D. Gochenour, Dillsburg, ....... | |
| 2258 | †Peerless Potash Compound, ............... | L. E. Speck, Wellsville, ........... | 6.08 |
| 2599 | | John A. Handshew, Shippensburg, .. | |
| | BAUGH & SONS CO., PHILADELPHIA, PA. | | |
| 2481 | †Baugh's 8 & 5 Special Alkaline Superphosphate. | Neyhard & Keller, Orangeville, ..... | 8.11 |
| 2272 | | Grover C. Myers, Gardners, ....... | |
| 2620 | | S. E. Shenk, Newville, ............ | |
| 2642 | †Baugh's 10 & 8 Phosphate and Potash, .. | Jeremiah Glepinger, Seigfried's Bridge, ............................. | 8.13 |
| 2345 | | A. R. Logue, Woodbury, ............ | |
| 3164 | | H. F. Tyson, Barto, ................ | |
| 2346 | †Baugh's 12 & 5 Phosphate and Potash .. | A. R. Logue, Woodbury, ............ | 8.89 |
| 2271 | | Grover C. Myers, Gardners, ....... | |
| 2410 | | A. Rossa & Co., Halstead, .......... | |
| | BOWKER FERTILIZER CO., NEW YORK CITY. | | |
| 2844 | †Bowker's 10 & 8, .......................... | John Sieber, Mifflintown, R. D.,... | 9.43 |
| 2713 | | H. F. Gump & Son, Everett, ...... | |
| 3215 | | J. C. Mattern, Stormstown, ......... | |
| 2880 | Bowker's Superphosphate, with Potash for Grain and Grass. | G. M. Engleborts, Mifflinburg, ..... | 9.36 |
| | CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS, HAGERSTOWN, MD. | | |
| 3322 | C. C. C. Eclipse Mixture, ................... | L. H. Leeter & Bro., Greencastle, | 11.15 |
| | CHESAPEAKE CHEMICAL CO., BALTIMORE, MD. | | |
| 3071 | C. C. Co.'s 12 & 5 Alkaline, ............... | A. H. Ulsh, Millerstown, .......... | 10.70 |
| | COE MORTIMER CO., NEW YORK. | | |
| 3199 | E. Frank Coe's Famous Prize Brand Grain and Grass Fertilizer. | L. Williams, St. Johns, ............. | 10.08 |
| 2635 | E. Frank Coe's High Grade Dissolved Phosphate and Potash. | Lewis Graver, Easton, R. No. 1,... | 9.10 |
| 3498 | E. Frank Coe's 12 & 5 Dissolved Phosphate and Potash. | Martin Shenk, Lititz, ............. | 12.85 |
| | COLUMBIA GUANO CO., BALTIMORE, MD. | | |
| 2443 | Columbia Grass and Grain Grower, ........ | M. P. Whitenight, Blomsburg, .... | 9.30 |
| 3079 | Columbia Potash Compound, ................ | Emanuel Troutman, Millertown, R. D. | 11.30 |

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†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | | | |
| 10.57 | 10.00 | 1.91 | 12.48 | 11.00 | 3.81 | ...... | 3.81 | 4.00 | 16.59 | 15.00 | 1689 |
| 12.43 | 12.00 | 2.11 | 14.54 | 13.00 | 6.24 | ...... | 6.24 | 5.00 | 20.49 | 17.00 | 187 |
| *8.90 | 10.00 | 2.00 | 10.90 | 11.00 | 5.85 | ...... | 5.85 | 5.00 | 17.49 | 15.60 | 2815 |
| | | | | | | | | | | 15.00 | 2306 |
| | | | | | | | | | | 15.50 | 3355 |
| 11.94 | 12.00 | 1.09 | 13.03 | 12.50 | 5.39 | ...... | 5.39 | 5.00 | 18.91 | 17.00 | 3491 |
| *9.80 | 10.00 | .92 | 10.72 | 10.50 | 5.48 | ...... | 5.48 | 5.00 | 20.34 | 19.50 | 2256 |
| | | | | | | | | | | 20.00 | 2328 |
| | | | | | | | | | | 16.00 | 2413 |
| *9.31 | 10.00 | 1.02 | *10.33 | 11.00 | 2.23 | ...... | 2.23 | 2.00 | 13.75 | 12.50 | 3349 |
| 8.31 | 8.00 | .80 | 9.11 | 9.00 | 3.67 | ...... | 3.67 | 2.00 | 14.38 | 16.00 | 3214 |
| *9.79 | 10.00 | 1.68 | 11.47 | ........ | 3.57 | ...... | 3.57 | 2.00 | 15.68 | 16.00 | 2597 |
| | | | | | | | | | | 15.00 | 2256 |
| | | | | | | | | | | 15.50 | 3334 |
| 7.09 | 7.00 | 1.14 | 8.23 | ........ | 5.63 | ...... | 5.63 | 5.00 | 15.69 | 15.00 | 2253 |
| | | | | | | | | | | 15.50 | 2599 |
| 8.23 | 8.00 | 1.17 | 9.40 | ........ | 5.54 | ...... | 5.54 | 5.00 | 16.42 | 14.75 | 2481 |
| | | | | | | | | | | 13.50 | 2272 |
| | | | | | | | | | | 14.00 | 2620 |
| 10.41 | 10.00 | 1.44 | 11.85 | ........ | 8.38 | ...... | 8.38 | 8.00 | 20.98 | 19.50 | 2642 |
| | | | | | | | | | | 16.27 | 2345 |
| | | | | | | | | | | 21.00 | 3164 |
| *11.69 | 12.00 | 1.29 | 12.98 | ........ | 5.72 | ...... | 5.72 | 5.00 | 19.10 | 15.04 | 2346 |
| | | | | | | | | | | 16.25 | 2271 |
| | | | | | | | | | | 20.00 | 2410 |
| 10.22 | 10.00 | .64 | 10.86 | 11.00 | 8.00 | ...... | 8.00 | 8.00 | 20.14 | ...... | 2844 |
| | | | | | | | | | | 20.00 | 2743 |
| | | | | | | | | | | 21.00 | 3245 |
| 10.13 | 10.00 | .68 | 10.81 | 11.00 | 2.26 | ...... | 2.26 | 2.00 | 14.24 | 15.00 | 2880 |
| *11.60 | 12.00 | .36 | 11.96 | ........ | 2.73 | ...... | *2.73 | 3.00 | 15.69 | 15.00 | 3322 |
| *11.62 | 12.00 | 1.66 | 13.28 | 13.00 | 6.06 | ...... | 6.06 | 5.00 | 19.56 | 17.50 | 3071 |
| 10.39 | 10.00 | 1.28 | 11.67 | 11.00 | 2.23 | ...... | 2.23 | 2.00 | 14.64 | 16.00 | 3199 |
| 8.26 | 8.00 | 1.28 | 9.54 | 9.00 | 5.11 | ...... | 5.11 | 5.00 | 16.02 | 12.25 | 2635 |
| 12.38 | 12.00 | 1.26 | 13.64 | 13.00 | 5.40 | ...... | 5.40 | 5.00 | 19.29 | 16.50 | 3498 |
| 10.37 | 10.00 | 1.12 | 11.49 | 10.50 | 2.94 | ...... | 2.94 | 2.00 | 14.78 | 13.50 | 2443 |
| 12.30 | 12.00 | 1.65 | 13.95 | 12.50 | 5.20 | ...... | 5.20 | 5.00 | 19.16 | ....... | 3079 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | HENRY COPE & CO., LINCOLN UNIVERSITY, PA. | | |
| 3021 | High Grade Soluble Phosphoric Acid and Potash. | Lyburn Whitaker, Oxford, | 9.65 |
| | EASTERN CHEMICAL CO., NEW YORK. | | |
| 2237 | Eastern Golden Harvest, | Diehl, Omwake & Diehl, Chambersburg. | 4.98 |
| 3320 | Eastern Potash Jewel, | Greencastle Elevator Co., Greencastle. | 9.95 |
| 2236 | Eastern Royal Compound, | Diehl, Omwake & Diehl, Chambersburg. | 8.43 |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | | |
| 1213 | †Crop Grower, | L. Arnold, Pfantz Valley, | 5.68 |
| 299 | | Lewis Arnold, Pfantz Valley, | |
| 2053 | | Wm. Davis, Jr., Greensboro, | |
| 782 | †No. 5 Alkaline, | M. C. Catherman, Millmont, R. D. | 8.15 |
| 1212 | | L. Arnold, Pfantz Valley, | |
| 298 | No. 8 Alkaline, | L. Arnold, Pfantz Valley, | 7.23 |
| | FARMER'S FERTILIZER WORKS, ELIZABETHTOWN, PA. | | |
| 3078 | Big Bonanza, | I. B. Secrist, Millerstown, | 10.70 |
| | W. S. FARMER & CO., BALTIMORE, MD. | | |
| 2295 | W. S. Farmer Co.'s Empire Alkaline Phosphate. | J. H. Duttera, New Oxford, | 8.43 |
| | GRIFFITH & BOYD CO., BALTIMORE, MD. | | |
| 2944 | †Gem Phosphate, | Geo. H. Wolf's Sons, Mt. Wolf, | 5.80 |
| 2421 | | Hartley & Blaine, Turbotville, | |
| 2851 | | B. F. Gayman, Thompsontown, | |
| 2420 | †Royal 10 & 8 Mixture, | Hartley & Blaine, Turbotville, | 10.65 |
| 2892 | | R. M. Arborgast, Winfield, | |
| 2850 | †Griffith & Boyd's Soluble 12 x 5 Mixture. | B. F. Gayman, Thompsontown, | 10.55 |
| 3046 | | Centerville Grange, Dickinson, | |
| 1608 | Special Mixture, | H. J. Gulver, Nescopeck, R. No. 2, | 7.90 |
| | S. M. HESS & BRO., INC., PHILADELPHIA, PA. | | |
| 2434 | †Peerless Phosphate, | S. J. Brungard, Salona, R. N. 1, | 10.93 |
| 2364 | | J. M. Cogan, Williamsburg, | |
| 2811 | | Geo. Emerick, Centre Hall, | |
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 2861 | †Hubbard's Alkaline 12 & 5, | Wm. Atkinson, McVeytown, | 12.40 |
| 2349 | | L. R. Ober, Curry, | |
| 2589 | | Elmer P. Shugart, Carlisle, | |
| 2357 | †Hubbard's B. & P. 10 & 2, | F. P. Waite, Tyrone, | 10.45 |
| 2310 | | D. E. Brandt, East Berlin, | |
| 2132 | | Chas. W. Cook, Beech Creek, R. No. 1, | |
| | M. P. HUBBARD & CO., BALTIMORE, MD. | | |
| 2468 | Hubbard's Soluble Rock and Potash, | S. R. Hower, Catawissa, R. No. 1, | 10.50 |
| | JERECKI CHEMICAL CO., CINCINNATI, O. | | |
| 3302 | Black Soil Special, | S. S. Masholder, Rockwood, | 10.53 |
| | KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA. | | |
| 3257 | †Keystone 8 & 5, | Alfred Kahler, Bethlehem, R. No. 2, | 7.25 |
| 3384 | | Geo. Ranch, Myerstown, | |
| 3385 | Keystone 10 & 2, | Geo. Ranch, Myerstown, | 8.28 |
| | LANCASTER BONE FERTILIZER CO., LANCASTER, PA. | | |
| 2947 | Diamond, | Jacob Rensel, Manchester, | 7.52 |
| 3130 | Harvest King, | Ralph Hoover, Everett, R. No. 1, | 7.68 |
| 2378 | Special Grange Mixture, | Lenz & Burkhart, Loretto, R. No. 1, | 8.20 |

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†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| 10.42 | 9.00 | .78 | 11.15 | 10.00 | 4.27 | ...... | 4.27 | 4.00 | 16.51 | 16.50 | 3021 |
| 8.04 | 8.00 | .45 | 8.49 | ........ | 5.84 | ...... | 5.84 | 5.00 | 16.33 | 13.75 | 2237 |
| *11.77 | 12.00 | .78 | 12.55 | ........ | 5.22 | ...... | 5.22 | 5.00 | 18.48 | 15.75 | 3320 |
| 10.90 | 10.00 | .83 | 11.23 | ........ | 2.47 | ...... | 2.47 | 2.00 | 14.88 | 12.25 | 2236 |
| 6.85 | 6.00 | .43 | 6.78 | 6.50 | 3.44 | ...... | 3.44 | 3.00 | 12.66 | ......<br>......<br>19.00 | 1218<br>299<br>2053 |
| 12.21 | 12.00 | .92 | 13.13 | 12.50 | 4.68 | ...... | *4.68 | 5.00 | 18.34 | 18.00<br>...... | 782<br>1212 |
| 8.21 | 8.00 | .27 | 8.48 | 8.50 | 8.04 | ...... | 8.04 | 8.00 | 18.64 | ........ | 298 |
| 8.84 | 8.00 | .31 | 9.15 | ........ | 4.83 | ...... | 4.83 | 5.00 | 15.82 | 15.00 | 3708 |
| 10.06 | 10.00 | .57 | *10.62 | 11.00 | 5.45 | ...... | 5.45 | 5.00 | 17.40 | 15.50 | 2295 |
| 6.64 | 6.00 | 2.68 | 9.32 | 7.00 | 3.50 | ...... | 3.50 | 3.00 | 13.72 | 14.00<br>13.00<br>14.00 | 2944<br>2421<br>2851 |
| 10.37 | 10.00 | 3.49 | 13.86 | 11.00 | 6.93 | ...... | *6.93 | 8.00 | 20.20 | 19.00<br>17.50 | 2420<br>2882 |
| 12.55 | 12.00 | 1.53 | 14.08 | 13.00 | 5.11 | ...... | 5.11 | 5.00 | 19.39 | 17.50<br>...... | 2850<br>3046 |
| 10.80 | 10.00 | 1.88 | 12.68 | 11.00 | 8.43 | ...... | *8.43 | 10.00 | 21.48 | 19.00 | 1608 |
| *11.52 | 12.00 | .87 | *12.39 | 13.00 | 5.68 | ...... | 5.68 | 5.00 | 18.85 | 18.00<br>17.50<br>20.00 | 2434<br>2364<br>2811 |
| *10.58 | 12.00 | 1.69 | *12.27 | 13.00 | 5.70 | ...... | 5.70 | 5.00 | 18.45 | 20.50<br>16.00<br>...... | 2861<br>2349<br>2589 |
| 10.01 | 10.00 | 2.04 | 12.05 | 11.00 | 2.34 | ...... | 2.34 | 2.00 | 14.74 | 15.00<br>13.40<br>15.00 | 2357<br>2310<br>2432 |
| *9.32 | 10.00 | 1.78 | *11.10 | 11.50 | 2.76 | ...... | 2.76 | 2.00 | 14.55 | 13.00 | 2468 |
| 9.47 | 8.00 | 1.28 | 10.75 | 9.00 | 5.92 | ...... | *5.92 | 8.00 | 20.53 | 20.00 | 3302 |
| 8.06 | 8.00 | .71 | *8.77 | 9.00 | 4.91 | ...... | 4.91 | 5.00 | 15.45 | 15.00<br>...... | 3257<br>3384 |
| *4.60 | 10.00 | 1.20 | *5.80 | 11.00 | 1.96 | ...... | 1.96 | 2.00 | 10.14 | 15.00 | 3385 |
| 8.86 | 8.00 | .81 | 9.67 | 9.00 | 1.78 | ...... | *1.78 | 2.00 | 12.90 | 14.00 | 2947 |
| 8.29 | 8.00 | .54 | 8.83 | 9.00 | 4.78 | ...... | *4.78 | 5.00 | 15.48 | 17.00 | 3180 |
| *9.57 | 10.00 | .51 | *10.08 | 11.00 | 8.87 | ...... | 8.87 | 8.00 | 20.52 | 23.00 | 2378 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | LEBANON FERTILIZER WORKS, LEBANON, PA. | | |
| 2578 | Levan's Special Mixture Fertilizer, | Adam Gerhart, Rehrersburg, | 7.03 |
| 2854 | Levan's Super Phospuate and Potash Fertilizer, | John H. Stover, Thompsontown, | 6.90 |
| | LISTER AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | | |
| 2692 | †Lister's Atlas Brand Alkaline Fertilizer, | Jacob Bowser, St. Clairsville, | 10.48 |
| 2806 | | Geo. B. Thompson, State College, | |
| 2695 | †Lister's Dissolved Phosphate and Potash, | Jacob Bowser, St. Clairsville, | 9.20 |
| 2686 | | D. B. Griffith, Wolfsburg, R. D., | |
| 3056 | | Isaac Plasterer, Lebanon, | |
| 2686 | †Lister's Grain and Grass Fertilizer, | D. B. Griffith, Wolfsburg, | 8.75 |
| 2694 | | Jacob Bowser, St. Clairsville, | |
| 2685 | †Lister's Plant Food, | D. B. Griffith, Wolfsburg, | 6.93 |
| 2559 | | C. G. Shetron, Millersburg, | |
| 3122 | | S. T. Taylor, New Paris, | |
| 3238 | Lister's Potash Mixture, | S. A. Hosteter, Belleville, | 8.23 |
| 2718 | †Lister's Ten Per Cent. Alkaline Potato Fertilizer. | Nevin Miller, Cottage, | 8.95 |
| 2560 | | C. G. Shetron, Millersburg, | |
| 3055 | | Isaac Plasterer, Lebanon, R. No. 5, | |
| | FREDERICK LUDLAM CO., THE, BALTIMORE, MD. | | |
| 2245 | †Ludlam Cecrops Fertilizer On Top, | Amos F. Bushey, York Springs, | 10.41 |
| 3233 | | A. A. Guss, Lewistown, | |
| 2603 | Ludlam Cecrop Fertilizer Phosphate and Potash. | E. N. Diehl, Shippensburg, R. D., | 9.70 |
| 2722 | †Ludlam Cecrop Fertilizer Wheat Special, | S. L. Smith, Mill Creek, R. D., | 9.23 |
| 2817 | | G. C. Miller, Bellefonte, R. D., | |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | | |
| 3391 | Martin's Potash and Soluble Phosphate, No. 2. | Hershey Store Co., Hershey, | 11.55 |
| 2453 | Martin's Potash and Soluble Phosphate, No. 3. | W. W. Parker, Rohrsburg, | 15.15 |
| 2646 | Martin's Potash and Soluble Phosphate, No. 4. | Edward Houck, Bangor, | 9.25 |
| | MILLER FERTILIZER CO., THE, BALTIMORE, MD. | | |
| 2834 | †Clinch Phosphate, | J. S. Waite & Co., Bellefonte, | 9.18 |
| 2417 | | Hartley & Blaine, Turbotsville, | |
| 2910 | | J. Emory Maul, Iron Ore, | |
| 2882 | Miller's Potash Mixture, | J. S. Waite & Co., Bellefonte, | 8.15 |
| 3370 | W. K. S. Special, | Jno. K. Beidler & Son, Oakville, | 12.03 |
| | NASSAU FERTILIZER CO., NEW YORK. | | |
| 3086 | †Ten and Eight Special, | Kemmer & Co., Lehighton, | 9.48 |
| 2552 | | H. H. Snyder, Dietrick, | |
| 3235 | | J. D. Gaybill & Son, Belleville, | |
| 2819 | †Potash and Phosphate, | John G. Dubbs, Bellefonte, R. D., | 9.03 |
| 2551 | | H. H. Snyder, Dietrick, | |
| 3072 | | A. H. Ulsh, Millerstown, | |
| | OBER & SONS CO., BALTIMORE, MD. | | |
| 2290 | Ober's Dissolved Phosphate and Potash, | D. Blocher & Co., Gettysburg, | 6.73 |
| 2990 | †Ober's Standard Potash Compound, | John Phillipps, Sunbury, R. No. 3, | 9.95 |
| 2342 | | A. B. Mock, Martinsburg, | |
| 2594 | | H. G. Herman, New Kingston, | |
| | PATAPSCO GUANO CO., BALTIMORE, MD. | | |
| 2288 | †Baltimore Soluble Phosphate, | E. C. Thomas, Gettysburg, | 11.15 |
| 2451 | | Geo. E. Dodson, Rohrsburg, | |
| 2450 | †Patapsco High Grade Phosphate and Potash. | Geo. E. Dodson, Rohrsburg, | 10.10 |
| 2289 | | E. C. Thomas, Gettysburg, | |
| 2636 | | Irwin Fisher, Nazareth, | |
| | PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. | | |
| 2268 | †Levering's I. X. L. Crop Grower, | D. F. Stetzel, York Springs, | 7.80 |
| 3319 | | H. P. McLaughlin, Mason Dixon, | |

†Composite sample.

**FERTILIZER—Continued.**

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | | | |
| 7.81 | 8.00 | .92 | *8.73 | 9.00 | 5.20 | ...... | 5.20 | 5.00 | 15.64 | ........ | 2578 |
| *9.55 | 10.00 | 1.48 | 11.03 | 11.00 | 2.46 | ...... | 2.46 | 2.00 | 14.31 | ........ | 2854 |
| 12.19 | 12.00 | .73 | 12.92 | 13.00 | 5.32 | ...... | 5.32 | 5.00 | 18.85 | 18.00<br>...... | 2692<br>2806 |
| 10.00 | 10.00 | .49 | *10.49 | 11.00 | 2.35 | ...... | 2.35 | 2.00 | 14.18 | 14.70<br>14.00<br>17.00 | 2695<br>2687<br>3056 |
| 9.71 | 9.00 | .70 | 10.41 | 10.00 | 5.14 | ...... | 5.14 | 5.00 | 16.89 | 15.00<br>16.00 | 2686<br>2694 |
| 6.92 | 6.00 | .51 | 7.43 | 7.00 | 3.23 | ...... | 3.23 | 3.00 | 12.90 | 12.25<br>13.00<br>13.00 | 2685<br>2559<br>3122 |
| 8.34 | 8.00 | .37 | *8.71 | 9.00 | 5.21 | ...... | 5.21 | 5.00 | 15.75 | 16.00 | 3238 |
| 8.38 | 8.00 | .26 | *8.64 | 9.00 | 11.17 | ...... | 11.17 | 10.00 | 21.92 | 20.50<br>20.00<br>19.50 | 2718<br>2560<br>3055 |
| 10.04 | 10.00 | .64 | *10.68 | 11.00 | 6.42 | ...... | 6.42 | 6.00 | 18.40 | 16.60<br>17.50 | 2245<br>3233 |
| 10.81 | 10.00 | .31 | 11.12 | 11.00 | 2.46 | ...... | 2.46 | 2.00 | 14.78 | ........ | 2603 |
| 8.47 | 8.00 | .36 | 8.83 | 9.00 | 2.23 | ...... | 2.23 | 2.00 | 12.94 | 14.50<br>14.00 | 2722<br>2817 |
| *9.68 | 10.00 | 1.03 | 10.71 | ........ | 1.60 | .33 | 1.93 | 2.00 | 16.86 | 13.00 | 3391 |
| *11.70 | 12.00 | .49 | 12.19 | ........ | 2.93 | ...... | *2.93 | 5.00 | 16.02 | 16.50 | 2458 |
| 8.65 | 8.00 | .75 | 9.40 | ........ | 4.77 | ...... | *4.77 | 5.00 | 15.75 | 13.25 | 2646 |
| *8.62 | 10.00 | .92 | *9.54 | 10.50 | 2.09 | ...... | 2.09 | 2.00 | 13.10 | 14.00<br>13.50<br>13.00 | 2834<br>2417<br>2910 |
| 10.50 | 10.00 | .57 | 11.07 | 10.50 | 5.12 | ...... | 5.12 | 5.00 | 17.37 | 16.00 | 2882 |
| 12.30 | 12.00 | 1.19 | 13.49 | 12.50 | 4.97 | ...... | 4.97 | 5.00 | 18.74 | 16.00 | 3370 |
| 10.24 | 10.00 | .81 | 11.05 | 11.00 | 8.07 | ...... | 8.07 | 8.00 | 20.28 | 20.00<br>20.40<br>20.00 | 3086<br>2552<br>3235 |
| 10.16 | 10.00 | .74 | 10.90 | 11.00 | 5.70 | ...... | 5.70 | 5.00 | 17.80 | 19.50<br>18.00<br>16.00 | 2819<br>2551<br>3072 |
| 10.73 | 10.00 | .83 | 11.56 | 11.00 | 2.62 | ...... | 2.62 | 2.00 | 15.08 | 14.00 | 2290 |
| 12.07 | 12.00 | .74 | 12.81 | 13.00 | 5.27 | ...... | 5.27 | 5.00 | 18.70 | 16.50<br>18.00<br>16.00 | 2990<br>2342<br>2594 |
| 11.37 | 11.00 | .74 | 12.11 | 12.00 | 2.38 | ...... | 2.38 | 2.00 | 15.30 | 15.00<br>14.00 | 2288<br>2451 |
| *10.61 | 11.00 | .88 | *11.49 | 12.00 | 5.70 | ...... | 5.70 | 5.00 | 18.18 | 18.00<br>18.00<br>17.00 | 2450<br>2289<br>2636 |
| 9.83 | 10.00 | .88 | 10.71 | ........ | 3.36 | ...... | 3.36 | 3.00 | 15.22 | 15.00<br>15.00 | 2268<br>3319 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | FOR THE POLLOCK FERTILIZER CO., BALTIMORE, MD. BY THE A. A. C. CO. | | |
| 2689 | †The Pollock Fertilizer Co. Dissolved Phosphate and Potash. | Thos. B. Muckle, Alum Bank, ... | 9.43 |
| 2285 | | E. S. Kelly, Gettysburg, .......... | |
| 2748 | | Francis Baker, Everett, .............. | |
| 2679 | †The Pollock Fertilizer Co. Soluble Phosphate. | Frank Oster, Osterburg, ............ | 9.46 |
| 2747 | | Francis Baker, Everett, ............ | |
| 2282 | The Pollock Fertilizer Co. Star Alkaline Phosphate. | E. S. Kelly, Gettysburg, ............ | 10.58 |
| 2691 | †The Pollock Fertilizer Co. Sun Guano,.. | J. M. Lutz, Shirleysburg, .......... | 9.30 |
| 2727 | | Thos. B. Mickle, Alum Bank, R. D. | |
| 3129 | †The Pollock Fertilizer Co. Victor Brand Phosphate. | Jno. B. Bortz, Bedford, ............ | 9.58 |
| 3278 | | J. L. Longnecker, Woodbury, ...... | |
| | RAUSBURG FERTILIZER CO., FREDERICK, MD. | | |
| 2609 | Special Rock and Potash, .................... | J. D. Garman, Mongul, R. No. 5, | 14.06 |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | | |
| 2803 | †Rasin's Half and Half Mixture, ........ | S. E. Weber, Boalsburg, ............ | 7.48 |
| 3121 | | A. C. Richards & Son, Schellsburg, R. D. | |
| 186 | Rasin's High Grade Phosphate and Potash, | C. B. McCormick, State College,... | 10.66 |
| 2891 | Rasin's Special Formula for Corn and Buckwheat. | Adam Krug, Allenwood, ............. | 6.20 |
| 2416 | †Rasin's Special Phosphate and Potash,.. | H. A. Snyder, Strawberry Ridge,.. | 9.48 |
| 2257 | | R. F. Strayer, Wellsville, .......... | |
| 2800 | | C. B. McCormick, State College, .. | |
| 2824 | Rasin's Triple Phosphate and Potash, .... | W. H. Krebs, Madisonburg, ....... | 10.78 |
| 2529 | †Rasin's Wheat Potash Mixture, ........ | E. H. Keen & Co., Parkesburg, .... | 7.00 |
| 2440 | | H. B. Low & Son, Orangeville, .... | |
| 2700 | | Blair Kauffman, Frankstown, ...... | |
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 2522 | †Alkaline Phosphate and Potash, ......... | W. W. Moses, Exton, .............. | 7.15 |
| 3457 | | Henry Lutz, Denver, R. D. No. 1, | |
| 2520 | †High Grade Potash Mixture, ............ | W. W. Moses, Exton, .............. | 8.73 |
| 2275 | | Grover C. Myers, Gardners, ........ | |
| 2577 | | C. H. Weber, Rehresburg, .......... | |
| 3458 | Reading 12 and 5, ............................ | Henry Lutz, Denver, R. No. 1, .... | 9.53 |
| 2651 | †Soluble Phosphate and Potash, .......... | Jeremiah Ceyghrs, E. Stroudsburg, | 8.40 |
| 2371 | | Victor Denny, Cresson, ............ | |
| 2583 | | C. H. Weber, Rehresburg, ......... | |
| | ROBERT A. REICHARD, ALLENTOWN, PA. | | |
| 2633 | Farmers' Favorite, ........................... | E. J. Gerlauch, Bethlehem, ........ | 6.85 |
| 3069 | Superior Phosphate, ......................... | Lovine Lerch, Bethlehem, .......... | 8.55 |
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 2477 | †Royster's High Grade Potash Mixture,.. | A. B. Mendenhall, Benton, R. No. 5, | 9.95 |
| 2403 | | S. T. Ingham, Nicholson, .......... | |
| 2810 | | R. D. Foreman, Centre Hall, ...... | |
| 2735 | †Royster's Special Fruit and Crop Grower, | Huston Bros., Three Springs, ...... | 9.23 |
| 2264 | | John W. King, York Springs, .... | |
| 2758 | | Chas. Baer, Allentown, R. No. 4,.. | |
| 2734 | †Royster's XXX Alkaline Phosphate, ..... | Huston Bros., Three Springs, ...... | 9.75 |
| 2262 | | Wm. F. Howe, York Springs, R. No. 8. | |
| 3211 | | T. O. Walters, Winfield, ............ | |
| | SCHAAL SHELDON FERTILIZER CO., ERIE, PA. | | |
| 2626 | Dissolved Phosphate with Extra Potash,.. | Geo. Deitch, Carlisle, R. No. 9,.... | 9.15 |
| 2786 | | C. E. Starr, Three Springs, ...... | |

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†Composite sample.

**FERTILIZER—Continued.**

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| 9.98 | 10.00 | .57 | *10.55 | 11.00 | 4.36 | ...... | 4.36 | 4.00 | 16.24 | 15.25<br>14.50<br>17.00 | 2689<br>2285<br>2748 |
| 10.62 | 10.00 | .66 | 11.28 | 11.00 | 2.01 | ...... | 2.01 | 2.00 | 14.35 | 16.40<br>15.00 | 2679<br>2747 |
| *11.62 | 12.00 | .48 | *12.10 | 13.00 | 3.81 | ...... | *3.81 | 5.00 | 16.83 | 16.50 | 2282 |
| 10.26 | 10.00 | .64 | 10.90 | 11.00 | 6.11 | ...... | 6.11 | 6.00 | 18.26 | 16.75<br>17.50 | 2691<br>2727 |
| 10.46 | 9.00 | .57 | 11.03 | 10.00 | 2.97 | ...... | 2.97 | 1.00 | 15.18 | 15.00<br>15.00 | 3129<br>3278 |
| 10.04 | 10.00 | 2.26 | 12.30 | ........ | 4.24 | ...... | *4.24 | 5.00 | 16.78 | 15.00 | 2602 |
| 6.21 | 6.00 | 1.31 | 7.52 | 7.00 | 2.99 | ...... | 2.99 | 3.00 | 14.25 | 14.00<br>12.50 | 2803<br>3121 |
| 12.93 | 12.00 | 1.98 | 14.91 | 13.00 | 4.63 | ...... | *4.63 | 5.00 | 19.17 | 18.50 | 186 |
| *5.33 | 6.00 | 1.32 | *6.65 | 7.00 | 3.28 | ...... | 3.28 | 3.00 | 12.09 | 13.00 | 2891 |
| *8.51 | 10.00 | 1.94 | *10.45 | 11.00 | 5.40 | ...... | 5.40 | 5.00 | 16.74 | 15.00<br>14.25<br>16.50 | 2416<br>2257<br>2800 |
| *12.48 | 13.00 | 2.44 | 14.92 | 14.00 | 6.56 | ...... | 6.56 | 6.00 | 20.95 | ........ | 2824 |
| 7.93 | 8.00 | 1.31 | 9.24 | 9.00 | 5.13 | ...... | 5.13 | 5.00 | 15.85 | 16.00<br>14.75<br>16.00 | 2529<br>2440<br>2700 |
| 8.19 | 8.00 | .73 | 8.92 | 9.00 | 5.01 | ...... | 5.01 | 5.00 | 18.12 | 18.00<br>17.00 | 2522<br>3457 |
| *9.67 | 10.00 | .95 | *10.62 | 11.00 | 10.41 | ...... | 10.41 | 10.00 | 22.30 | 25.00<br>23.00<br>21.00 | 2520<br>2275<br>2577 |
| *11.79 | 12.00 | 1.49 | 13.28 | 13.00 | 4.63 | ...... | *4.63 | 5.00 | 18.16 | 19.00 | 3458 |
| *9.63 | 10.00 | 1.06 | *10.69 | 11.00 | 2.30 | ...... | 2.30 | 2.00 | 14.08 | 13.75<br>16.00<br>15.00 | 2651<br>2371<br>2583 |
| *7.42 | 8.00 | .89 | *8.31 | 9.00 | 5.90 | ...... | 5.90 | 5.00 | 16.08 | 18.00 | 2633 |
| 9.97 | 10.00 | .83 | *10.80 | 11.00 | 7.39 | ...... | *7.39 | 8.00 | 19.44 | 21.00 | 3089 |
| 10.16 | 10.00 | 1.25 | 11.41 | 10.50 | 5.60 | 4.74 | 10.34 | 10.00 | 23.84 | 22.00<br>20.00<br>20.40 | 2477<br>2408<br>2810 |
| 10.18 | 10.00 | .71 | 10.89 | 10.50 | 8.18 | ...... | 8.18 | 8.00 | 20.36 | 17.80<br>18.00<br>21.00 | 2785<br>2264<br>2758 |
| 10.06 | 10.00 | 1.06 | 11.12 | 10.50 | 6.01 | ...... | 6.01 | 5.00 | 18.14 | 13.20<br>16.00<br>...... | 2734<br>2262<br>3211 |
| 10.47 | 10.00 | .45 | 10.92 | 11.00 | 3.99 | ...... | 3.99 | 4.00 | 16.17 | ......<br>14.00 | 2626<br>2786 |

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*Constituent falls below guaranty.

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| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | SCOTT FERTILIZER CO., ELKTON, MD. | | |
| 3000 | Alkaline Phosphate 8-5, | W. H. Diehl, Northumberland, R. D. | 10.45 |
| 2906 | Fritch's Special, | Chas. G. Carbaugh, Hanover, R. D., | 11.90 |
| 3002 | †12 and 5 Phosphate and Potash, | W. H. Diehl, Northumberland, R. D. | 11.58 |
| 2905 | | Chas. G. Carbaugh, Hanover, R. D., | |
| 3099 | | Wm. Beck, Nazareth, | |
| | SOUTHERN FERTILIZING CO., YORK, PA., BY THE A. A. C. CO. | | |
| 2752 | †Southern Fertilizer Co., Farmers' Mixture. | Peter Baer, Breinigsville, | 11.25 |
| 2964 | | J. Emanuel Smith, York, | |
| | SWIFT & CO., CHICAGO, ILL. | | |
| 3146 | Swift's Pure Diamond F. Fertilizer, | P. J. Osterling & Son, Butler, | 6.43 |
| 3299 | †Swift's Pure Diamond H. Fertilizer, | Geo. W. Stewart, Indiana, R. No. 4, | 8.90 |
| 3423 | | Linford Foulke, Quakertown, | |
| 3364 | Swift's Pure High Grade Phosphate and Potash. | J. H. Ellenmyer, Liverpool, | 8.18 |
| | I. P. THOMAS & SONS CO., PHILADELPHIA, PA. | | |
| 2614 | †Alkaline Fertilizer, | J. C. Whistler, Newville, | 10.15 |
| 2391 | | Wysox Coal & Hay Co., Wysox, | |
| 2622 | | John A. Miller, Oakdale, | |
| 2480 | †Special Alkaline Fertilizer, | Thos. C. Knouse, Benton, R. No. 5, | 11.55 |
| 2258 | | A. J. Harbold, Bermudian, | |
| 2512 | | Theo. M. Griffith & Son, Downingtown. | |
| | TUSCARORA FERTILIZER CO., BALTIMORE, MD. | | |
| 3346 | Phosphate and Potash, | Geo. Walker, Chambersburg, | 9.95 |
| | FOR J. E. TYGERT CO., BY AM. AG. CHEM. CO., NEW YORK. | | |
| 3260 | Electro Phosphate, | Robt. F. Brown, Easton, R. No. 5, | 11.25 |
| | U. S. FERTILIZER CO., BALTIMORE, MD. | | |
| 2798 | Farm Bell Special Mixture, | Elmer C. Ross, Lemont, | 9.70 |
| | VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA. | | |
| 2301 | V. C. C. Co's. Giant Phosphate and Potash, | J. R. Weaver & Bro., New Oxford, | 8.48 |
| 2300 | V. C. C. Co's. Special Potash Mixture, | J. R. Weaver & Bro., New Oxford, | 7.05 |
| 2302 | V. C. C. Co's. Special Phosphate and Potash. | J. R. Weaver & Bro., New Oxford, | 8.35 |
| 2684 | V. C. C. Co's. Standard Phosphate and Potash. | Jos. Knisely, Alum Bank, | 11.05 |
| | FOR W. E. WHANN CO., BY AM. AG. CHEM. CO., NEW YORK. | | |
| 2664 | Whann's Chester Valley Favorite Fertilizer, | Oscar Snyder, Egypt, | 11.15 |
| | ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD. | | |
| 3185 | Woolridge's Liberty Bell Potash Mixture, | Chas. E. Everett, Sittler, | 10.63 |
| 3027 | †Woolridge's No. 1 Phosphate and Potash, | Millhouse Bros., Mendenhall, | 9.83 |
| 3171 | | Lott D. Evens, Geigers Mills, | |
| | YORK CHEMICAL WORKS, YORK, PA. | | |
| 3118 | †Codorus Brand, | Harry Burns, Spring Hope, | 6.60 |
| 2619 | | J. M. Peiffer, Newville, | |
| 3229 | | Sleininger Bros., Middleburg, | |
| 2464 | †Dempwolf's Red Cross, | J. S. Hartzel, Catawissa, | 7.68 |
| 2362 | | S. F. Hetrick, Williamsburg, | |
| 2662 | | Geo. J. Edleman, Bath, | |

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†Composite sample.

FERTILIZER—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | Insoluble. | Total. | | Present as muriate. | Present as sulphate. | Total. | | | | |
| Found. | Guaranteed. | | Found. | Guaranteed. | | | Found. | Guaranteed. | | | |
| 10.06 | 8.00 | 1.48 | 11.54 | ........ | 5.71 | ...... | 5.71 | 5.00 | 18.00 | ........ | 3000 |
| 13.53 | 13.00 | 1.33 | 14.86 | ........ | 6.79 | ...... | 6.79 | 6.00 | 21.56 | 20.00 | 2906 |
| 12.96 | 12.00 | 1.10 | 14.06 | ........ | 5.08 | ...... | 5.03 | 5.00 | 19.27 | ...... | 3002 |
| | | | | | | | | | | 18.50 | 2905 |
| | | | | | | | | | | ...... | 3099 |
| *9.45 | 10.00 | 1.20 | *10.65 | 11.00 | 2.52 | ...... | 2.52 | 2.00 | 17.02 | 15.00 | 2752 |
| | | | | | | | | | | 15.00 | 2964 |
| *7.64 | 8.00 | 1.46 | 9.10 | ........ | 3.26 | ...... | 3.26 | 3.00 | 13.75 | 16.00 | 3146 |
| *11.09 | 12.00 | 1.04 | 12.13 | ........ | 5.12 | ..... | 5.12 | 5.00 | 17.98 | 18.00 | 3299 |
| | | | | | | | | | | 18.00 | 3423 |
| *9.55 | 10.00 | .76 | 10.31 | ........ | 4.29 | ...... | 4.29 | 4.00 | 15.94 | 15.50 | 3364 |
| 10.49 | 10.00 | .79 | 11.28 | 11.00 | 2.12 | ...... | 2.12 | 2.00 | 14.40 | 13.00 | 2614 |
| | | | | | | | | | | 15.00 | 2391 |
| | | | | | | | | | | 14.00 | 2622 |
| *9.55 | 10.00 | .94 | *10.49 | 11.00 | 4.15 | ...... | 4.15 | 4.00 | 15.86 | 17.00 | 2480 |
| | | | | | | | | | | 16.00 | 2258 |
| | | | | | | | | | | 17.00 | 2512 |
| 9.82 | 10.00 | 1.07 | 10.89 | 10.50 | 2.10 | ...... | 2.10 | 2.00 | 14.02 | 13.00 | 3346 |
| 9.86 | 10.00 | 1.33 | 11.19 | 11.00 | 5.76 | ...... | 5.76 | 5.00 | 17.85 | 16.00 | 3260 |
| 10.49 | 10.00 | .66 | 11.15 | 11.00 | 4.50 | ...... | 4.50 | 4.00 | 16.80 | ........ | 2798 |
| *11.79 | 12.00 | 1.41 | 13.20 | 13.00 | 5.11 | ...... | *5.11 | 6.00 | 18.61 | 17.50 | 2301 |
| *7.51 | 8.00 | 1.44 | 8.95 | 9.00 | 5.08 | ...... | 5.08 | 5.00 | 17.73 | 14.50 | 2300 |
| 10.11 | 10.00 | 1.55 | 11.66 | 11.00 | 5.12 | ...... | 5.12 | 5.00 | 17.44 | 15.00 | 2302 |
| *9.37 | 10.00 | 2.26 | 11.63 | 11.00 | 2.81 | ...... | 2.81 | 2.00 | 14.34 | 13.00 | 2684 |
| 10.70 | 10.00 | 1.25 | 11.95 | 11.00 | 9.06 | ...... | *9.06 | 10.00 | 21.79 | ........ | 2664 |
| *11.10 | 12.00 | 1.38 | *12.48 | 13.00 | 2.51 | ...... | *2.51 | 3.00 | 15.45 | 17.75 | 3185 |
| 6.41 | 6.00 | 1.20 | 7.61 | 7.00 | 3.20 | ...... | 3.20 | 3.00 | 12.70 | 14.00 | 3027 |
| | | | | | | | | | | 12.00 | 3171 |
| 8.85 | 7.00 | .74 | 9.09 | 7.50 | 3.64 | ...... | 3.64 | 3.00 | 14.41 | 13.80 | 3118 |
| | | | | | | | | | | 13.50 | 2619 |
| | | | | | | | | | | 14.00 | 3229 |
| 9.89 | 10.00 | .83 | 10.72 | 10.50 | 5.19 | ...... | 5.19 | 5.00 | 17.12 | ...... | 2464 |
| | | | | | | | | | | 17.00 | 2362 |
| | | | | | | | | | | 16.50 | 2662 |

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*Constituent falls below guaranty.

# DISSOLVED BONE

## Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | |
| 2840 | Dissolved Animal Bone, ........................ | W. V. Shirk, Oakland, Mills, ................. |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | |
| 2367 | Lister's Celebrated Ground Bone and Tankage, Acidulated. | Bert Sutton, Ashville, R. No. 1, ............ |
| | D. B. MARTIN & CO., PHILADELPHIA, PA. | |
| 3209 | Martin's Pure Dissolved Animal Matter,.. | Wm. Stahl, Lewisburg, ........................ |
| | PIEDMONT-MT. AIRY GUANO CO., BALTIMORE, MD. | |
| 2127 | Piedmont Raw and Dissolved Bone, ........ | B. J. Crissman, Curwensville, ............... |
| | PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA. | |
| 3133 | Guano Fertilizer, ............................. | W. H. Dunlap, Jr., Canonsburg, ........... |
| | READING BONE FERTILIZER CO., READING, PA. | |
| 2273 | Dissolved Animal Matter, .................. | Grover C. Myers, Gardners, .................. |

†Composite sample.

# FERTILIZERS.

## Acid and Nitrogen.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. |  |  |  |  | Nitrogen in 100 Pounds. |  | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Available. |  | Insoluble. | Total. |  |  |  |  |  |  |
|  | Found. | Guaranteed. |  | Found. | Guaranteed. | Found. | Guaranteed. |  |  |  |
| 10.05 | 13.53 | 12.00 | 1.76 | 15.29 | 14.00 | *1.84 | 2.06 | 26.30 | ...... | 2840 |
| 5.75 | 6.00 | ........ | 8.92 | 14.92 | 12.00 | 3.00 | 2.67 | 27.27 | 27.00 | 2367 |
| 12.70 | 13.79 | 12.00 | 3.41 | 17.20 | ........ | 1.68 | 1.65 | 27.86 | ...... | 3209 |
| 5.60 | 11.03 | ........ | 9.05 | *20.08 | 22.90 | *2.04 | 2.47 | 28.16 | 32.00 | 2127 |
| 7.78 | *7.42 | 9.00 | 3.30 | *10.72 | 11.00 | 1.38 | 1.43 | 17.30 | 23.00 | 3133 |
| 4.75 | *9.60 | 10.00 | 2.19 | 11.79 | 11.00 | .98 | .82 | 13.61 | 17.00 | 2273 |

*Constituent falls below guaranty.

# ACIDULATED

## Furnishing

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | |
| 2698 | †Canton Chem. Baker's Dissolved S. C. Phosphate. | H. L. Orr, Tyrone, |
| 3314 | | Marion Warehouse Co., Marion, |
| 2334 | †Great Eastern Dissolved Acid Phosphate, | H. A. Durstine, Scottdale, |
| 2373 | | M. J. Bradley, Cresson, |
| 2607 | †Moro Phillips Soluble Phosphate, | Nickels & Stewart, Shippensburg, |
| 2919 | | Zinn Bros., West York, |
| 2352 | †Packers' Union Superior Acid Phosphate, | H. N. Dilling, Martinsburg, |
| 2723 | | C. S. Brown, Mill Creek, |
| 2993 | Reese's Elm Phosphate, | J. K. Hetrick, Sunbury, R. No. 3, |
| 3029 | Susquehanna Superior Rock Phosphate, | Milhous Bros., Mendenhall, |
| 3114 | Susquehanna Soluble Phosphate, | R. D. Smith, Wolfsburg, |
| 640 | Williams & Clark's Acorn Acid Phosphate, | I. M. Sheats, Sunbury, R. No. 3, |
| 3066 | Zell's Dissolved Phosphate, | B. F. Horting, Newport, |
| | AMERICAN FERTILIZING CO., BALTIMORE, MD. | |
| 2307 | High Grade Acid Phosphate, | A. D. Brown, East Berlin, |
| | ARMOUR FERTILIZER CO., BALTIMORE, MD. | |
| 3325 | Armour's Acid Phosphate, | Franklin Miller & Son, Greencastle, |
| 3298 | Cereal Phosphate, | Geo. J. New, Blairsville, |
| | BALTIMORE FERTILIZER CO., BALTI- MD. | |
| 2286 | Honest Acid Phosphate, | O. H. Lightner, Gettysburg, |
| | BOWKER FERTILIZER CO., NEW YORK. | |
| 2361 | Bowker's Apex Phosphate, | Blair Treese, Williamsburg, |
| 2621 | †Bowker's Soluble Phosphate, | Wm. B. Gray, Carlisle, |
| 2483 | | M. P. Whitenight, Bloomsburg, |
| 3136 | | W. H. McPeak, Hickory, |
| | JOS. COPE & CO., BALTIMORE, MD. | |
| 2725 | †Cope's Acidulated Phosphate, | Sam'l Goshom, Mt. Union, |
| 3014 | | O. W. Shortridge, Lincoln University, |
| | EASTERN CHEMICAL CO., NEW YORK. | |
| 2238 | Eastern Dissolved Phosphate, | Diehl, Omwake & Diehl, Chambersburg, |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | |
| 2331 | Eureka Soluble Phosphate, | C. S. Funk, New Stanton, |
| | HUBBARD FERTILIZER CO., THE, BALTIMORE, MD. | |
| 2351 | Hubbard's 14% Phosphate, | L. R. Ober, Curry, |
| | LANCASTER BONE FERTILIZER CO. | |
| 2945 | Farmers' Economy, | Jacob Rensel, Manchester, |
| 2431 | Independent Grain Grower, | Jos. C. Muthler, Beech Creek, R. No. 1, |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | |
| 2523 | †Lister's Buyers' Choice Acid Phosphate, | B. C. Mitchell, Brandamore, |
| 2386 | | G. W. Martin & Co., Saltsburg, |
| 2702 | | Ben Everhart, Franklinville, |
| 2741 | Lister's High Grade Acid Phosphate, | Ira Lake, Leidy, |
| | D. B. MARTIN & CO., PHILADELPHIA, PA. | |
| 3207 | †Martin's Acid Phosphate, | Wm. Stahl, Lewisburg, |
| 2645 | | Edward Houck, Bangor, |
| 3436 | | Passmore & Co., Nottingham, |

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†Composite sample.

# ROCK PHOSPHATE.

## Phosphoric Acid.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. | | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|
| | Available. | | Insoluble. | Total. | | | | |
| | Found. | Guaranteed. | | Found. | Guaranteed. | | | |
| 8.23 | 14.41 | 14.00 | .51 | 14.92 | 15.00 | 13.78 | 14.50<br>11.50 | 2698<br>3314 |
| 8.95 | 14.55 | 14.00 | .96 | 15.51 | 15.00 | 14.02 | .....<br>16.00 | 2334<br>2373 |
| 8.55 | 14.66 | 14.00 | .54 | 15.20 | 15.00 | 13.96 | 12.50<br>12.50 | 2607<br>2919 |
| 8.87 | 14.37 | 14.00 | .66 | 15.03 | 15.00 | 13.81 | 13.25<br>14.00 | 2352<br>2723 |
| 9.20 | 13.88 | 14.00 | .87 | *14.75 | 15.00 | 13.52 | 14.00 | 2903 |
| 9.20 | *13.18 | 14.00 | 2.81 | 15.99 | 15.00 | 13.71 | 13.00 | 3029 |
| 8.08 | *13.76 | 14.00 | .56 | *14.32 | 15.00 | 13.30 | 14.50 | 3114 |
| 7.90 | 14.89 | 14.00 | .68 | 15.57 | 15.00 | 14.17 | 15.00 | 640 |
| 9.08 | 15.00 | 14.00 | .47 | 15.47 | 15.00 | 14.17 | 11.85 | 3066 |
| 5.60 | 14.15 | 14.00 | 1.78 | 15.93 | 15.00 | 14.04 | 12.00 | 2307 |
| 11.78 | 16.99 | 16.00 | .82 | 17.81 | 16.50 | 15.55 | 12.50 | 3325 |
| 4.73 | 10.58 | 10.00 | .13 | 10.71 | 10.50 | 10.77 | 15.00 | 3298 |
| 7.48 | 17.41 | 14.00 | .92 | 18.33 | 15.00 | 16.09 | 13.00 | 2286 |
| 9.18 | 10.26 | 9.00 | 1.85 | 12.11 | 10.00 | 11.25 | 12.50 | 2361 |
| 8.50 | 13.94 | 14.00 | .77 | *14.71 | 15.00 | 13.52 | .....<br>13.00<br>16.00 | 2621<br>2483<br>3136 |
| 9.88 | 13.95 | 14.00 | 1.01 | 14.96 | 15.00 | 13.60 | 14.00<br>12.50 | 2725<br>3014 |
| 9.18 | 14.87 | 14.00 | .43 | 15.30 | ...... | 14.06 | 11.25 | 2238 |
| 8.23 | 16.45 | 14.00 | .61 | 17.06 | 14.50 | 15.26 | ...... | 2331 |
| 10.38 | 14.99 | 14.00 | .57 | 15.56 | 15.00 | 14.20 | 12.00 | 2351 |
| 7.38 | 14.20 | 14.00 | .36 | 14.56 | 15.00 | 13.56 | 11.50 | 2945 |
| 4.35 | *8.48 | 10.00 | 1.25 | *9.73 | 11.00 | 9.78 | 15.00 | 2431 |
| 8.08 | 14.40 | 14.00 | 1.28 | 15.68 | 15.00 | 14.04 | 12.50<br>16.00<br>12.00 | 2523<br>2386<br>2702 |
| 10.08 | 16.57 | 16.00 | .31 | 16.88 | ...... | 15.26 | 17.00 | 2741 |
| 9.10 | 14.21 | 14.00 | .45 | 14.66 | ...... | 13.59 | .....<br>12.00<br>12.00 | 3207<br>2645<br>3136 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | MILLER FERTILIZER CO., THE, BALTIMORE, MD. | |
| 2457 | †Acid Phosphate, | Grant Johnson, Millville, |
| 3326 | | Franklin Miller & Son, Greencastle, |
| | NASSAU FERTILIZER CO., BALTIMORE, MD. | |
| 2398 | Soluble Phosphate, | Peter Ace, Tunkhannock, |
| | PATAPSCO GUANO CO., BALTIMORE, MD. | |
| 2297 | Battle Ax Phosphate, | J. H. Hersh, New Oxford, |
| 2296 | †Patapsco Pure Dissolved S. C. Phosphate, | J. H. Hersh, New Oxford, |
| 2584 | | Jos. Burkholder, Hummelstown, |
| | POLLOCK FERTILIZER CO., BALTIMORE, MD. | |
| 2690 | †The Pollock Fertilizer Co. Dissolved S. C. Phosphate. | Thos. B. Mickle, Alum Bank, R. D., |
| 2283 | | E. S. Kelly, Gettysburg, |
| 3128 | | D. U. Diebert, Bedford, R. No. 1, |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | |
| 2580 | †Rasin's Acid Phosphate, | Elias S. Brubacher, Richland, |
| 2530 | | E. H. Keen & Co., Parkesburg, |
| 2696 | | B. F. Dively, Claysburg, |
| | READING BONE FERTILIZER CO., READING, PA. | |
| 2781 | 14% Acid Phosphate, | Frank Sheiver, Slatington, |
| | ROBT. A. REICHARD, ALLENTOWN, PA. | |
| 2749 | Acid Phosphate, | Wm. Lichtenwalter, Macungie, |
| | STANDARD GUANO CO., BALTIMORE, MD. | |
| 2914 | Standard High Grade Acid Phosphate, | H. H. Loose, Menges Mills, |
| | SWIFT & CO., BALTIMORE, MD. | |
| 2396 | †Swift's Garden City Phosphate, | Wyalusing Hay Co., Wyalusing, |
| 2926 | | H. P. Kocher, Wrightsville, |
| | I. P. THOMAS & SON, PHILADELPHIA, PA. | |
| 2449 | †S. C. Phosphate, | F. P. Davis, Bloomsburg, |
| 2265 | | A. J. Harbold, Bermudian, |
| 2615 | | J. C. Whistler, Newville, |
| | VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA. | |
| 2683 | V. C. C. Co's. Guaranteed 14% Acid Phosphate. | Jos. Knisely, Alum Bank, |
| | WOOLDRIDGE FERTILIZER CO., THE, BALTIMORE, MD. | |
| 2592 | Curacao Guano, | Briner & Jackson, Carlisle, |
| | ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD. | |
| 3169 | Wooldridge's Florida Acid Phosphate, | O. G. Yenser, Elverson, R. D., |
| | YORK CHEMICAL WORKS, YORK, PA. | |
| 2493 | †Dempwolf's Dissolved Phosphate, | Thos. Haines & Co., Malvern, |
| 2363 | | S. F. Hetrick, Williamsburg, |
| 2808 | | Elmer Musser, State College, R. D., |
| 2814 | Dempwolf's Super Phosphate, | Hiram Thompson, State College, |

†Composite sample.

## PHOSPHATE—Continued.

| Moisture in 100 pounds. | Phosphoric Acid in 100 Pounds. | | | | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|
| | Available. | | Insoluble. | Total. | | | | |
| | Found. | Guaranteed. | | Found. | Guaranteed. | | | |
| 11.35 | 15.93 | 14.00 | 1.23 | 17.11 | 14.50 | 15.07 | 13.00<br>13.00 | 2457<br>3326 |
| 6.38 | 14.63 | 14.00 | .61 | 15.24 | 15.00 | 13.96 | 15.00 | 2398 |
| 6.15 | 15.16 | 12.00 | .75 | 15.91 | 13.00 | 14.38 | 14.00 | 2297 |
| 9.60 | 14.23 | 14.00 | .89 | 15.11 | 15.00 | 13.75 | 15.00<br>13.00 | 2296<br>2584 |
| 7.63 | 14.31 | 14.00 | .93 | 15.24 | 15.00 | 13.84 | 13.25<br>12.50<br>13.50 | 2690<br>2283<br>3128 |
| 7.55 | 13.84 | 14.00 | 1.63 | 15.53 | 15.00 | 13.77 | 13.24<br>13.00<br>14.00 | 2580<br>2530<br>2696 |
| 7.53 | *13.80 | 14.00 | 1.25 | 15.05 | 15.00 | 13.59 | 15.00 | 2781 |
| 8.53 | 14.90 | 14.00 | .55 | 15.45 | 15.00 | 14.13 | 10.25 | 2749 |
| 7.55 | 15.02 | 14.00 | .79 | 15.81 | 15.00 | 14.29 | 12.50 | 2914 |
| 8.03 | *12.97 | 14.00 | 1.05 | 14.02 | ...... | 12.91 | 17.00<br>14.00 | 2396<br>2926 |
| 9.80 | 14.82 | 14.00 | .23 | 15.05 | 14.50 | 13.95 | 13.50<br>14.00<br>12.00 | 2449<br>2265<br>2615 |
| 7.80 | *12.44 | 14.00 | 1.83 | *14.27 | 15.00 | 12.81 | 12.50 | 2683 |
| 9.95 | *6.67 | 8.50 | 16.70 | 23.37 | 20.00 | 14.00 | 13.60 | 2592 |
| 9.03 | 13.85 | 14.00 | 1.76 | 15.61 | 15.00 | 13.81 | ...... | 3169 |
| 8.23 | 14.24 | 14.00 | .98 | 15.22 | 14.50 | 13.81 | 14.00<br>14.00<br>..... | 2493<br>2363<br>2808 |
| 8.83 | 16.67 | 16.00 | 1.01 | 17.63 | 16.50 | 15.58 | ...... | 2814 |

*Constituent falls below guaranty.

# GROUND BONE

## Furnishing Phosphoric

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | AHRENS FERTILIZER CO., ESTERLY, PA. | |
| 3060 | Pure Bone Meal, ............................. | Valentine Urich, Myerstown, ................. |
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | |
| 3506 | High Grade Ground Bone, ................. | M. P. Anderson, Phoenixville, ............... |
| | ARMOUR FERTILIZER WORKS, BALTIMORE, MD. | |
| 2713 | Raw Bone Meal, ............................. | D. Ross Gregory, Petersburg, R. D., ...... |
| | BAUGH & SONS CO., PHILADELPHIA, PA. | |
| 3024 | †Baugh's Fine Ground Bone, ............... | H. A. Mendenhall, Tougkenamon, ......... |
| 2943 | | Brillinger & Swartz, Emigsville, .......... |
| 3144 | | O. W. Luck, Zelienople, ..................... |
| | HENRY V. BAXTER, CHESTER, PA. | |
| 3405 | Baxter's Pure Ground Bone, ............... | Henry V. Baxter, Chester, .................. |
| | THE BERG COMPANY, PHILADELPHIA, PA. | |
| 2656 | Berg's Pure Raw Bone, Fine, ............. | Lovine Lerch, Bethlehem, R. D., ............ |
| | BOWKER FERTILIZER CO., NEW YORK. | |
| 2484 | Bowker's Fresh Ground Bone, ............. | M. P. Whitenight, Bloomsburg, ............ |
| 2498 | Bowker's Market Bone, ..................... | H. L. Moses, Chester Springs, ............. |
| | JAS. G. DOWNWARD CO., COATESVILLE, PA. | |
| 2514 | Pure Ground Raw Bone, ..................... | Jas. G. Downward, Coatesville, ............ |
| | HAFLEIGH & CO., PHILADELPHIA, PA. | |
| 3026 | Pure Raw Bone Meal, ....................... | W. H. Walker & Co., Kennett Square, .... |
| | LANCASTER BONE FERTILIZER CO., LANCASTER, PA. | |
| 2379 | †Ground Bone, ............................... | Lenz & Burkhart, Loretto, R. No. 1, ...... |
| 3131 | | Ralph Hoover, Everett, R. No. 1, ........ |
| | LEBANON FERTILIZER WORKS, LEBANON, PA. | |
| 2853 | Levan's Pure Fine Ground Bone Meal, .... | John H. Stover, Thompsontown, ........... |
| | LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. | |
| 2716 | Lister's Bone Meal, .......................... | Nevin Miller, Cottage, ....................... |
| | D. B. MARTIN & CO., PHILADELPHIA, PA. | |
| 2980 | Martin's Pure Ground Bone, ............... | Andrew Moore, Enon Valley, R. No. 1,.... |
| 2917 | †Martin's Pure Raw Bone Meal, .......... | H. H. Smyser, York, ........................ |
| 3435 | | Passmore & Co., Nottingham, ............. |
| | G. OBER & SONS CO., BALTIMORE, MD. | |
| 2998 | †Pure Raw Bone Meal, ..................... | John Phillips, Sunbury, R. No. 3, ........ |
| 3312 | | J. A. Witherspoon, Mercersburg, .......... |
| | PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. | |
| 2366 | Piedmont Bone Meal, ........................ | Custer & Pugh, Holsopple, ................. |
| | ROBERT A. REICHARD, ALLENTOWN, PA. | |
| 3190 | Raw Bone Meal, ............................. | Nathan Hunsicker, Snyders, ................ |
| | SCHAAL SHELDON FERTILIZER CO., BUFFALO, N. Y. | |
| 2966 | High Grade Ground Bone, ................. | Brooklyn Milling Co., Spartansburg, ........ |

†Composite sample.

# FERTILIZERS.

## Acid and Nitrogen.

| Moisture in 100 pounds. | Mechanical Analysis. |  | Chemical Analysis. |  |  |  | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Phosphoric Acid. |  | Nitrogen. |  |  |  |  |
|  | Diameter less than 1-50 inch "fine." | Diameter greater than 1-50 inch "coarse." | Found. | Guaranteed. | Found. | Guaranteed. |  |  |  |
| 7.63 | 40 | 60 | 23.49 | 22.34 | 4.56 | 4.19 | 36.80 | ......... | 3060 |
| 4.23 | 40 | 60 | 23.51 | 20.59 | *3.36 | 3.29 | 32.26 | 33.00 | 3506 |
| 8.25 | 39 | 61 | 23.20 | 22.00 | 4.02 | 3.70 | 34.45 | 33.00 | 2713 |
| 4.25 | 70 | 30 | *15.20 | 16.49 | 2.66 | 2.47 | 25.32 | 28.00<br>28.00<br>30.00 | 3024<br>2943<br>3144 |
| 8.68 | 58 | 42 | 31.28 | 25.00 | *1.38 | 2.47 | 31.79 | 28.00 | 3405 |
| 6.00 | 58 | 42 | 23.08 | 22.00 | 3.74 | 3.00 | 34.80 | 28.00 | 2656 |
| 7.18 | 65 | 35 | 27.62 | 22.88 | 2.66 | 2.47 | 33.90 | 32.00 | 2484 |
| 3.23 | 74 | 26 | 22.38 | 18.73 | 1.80 | 1.65 | 27.75 | 32.00 | 2498 |
| 5.28 | 47 | 53 | 23.59 | 20.00 | 2.90 | 2.85 | 31.11 | 31.00 | 2514 |
| 8.95 | 58 | 42 | *25.56 | 25.84 | 3.91 | 3.98 | 37.21 | 32.50 | 3026 |
| 3.93 | 73 | 27 | 22.82 | 22.50 | 2.81 | 2.40 | 29.98 | 32.00<br>28.00 | 2379<br>3131 |
| 3.90 | 67 | 33 | *23.91 | 27.00 | *2.22 | 2.55 | 30.02 | 28.00 | 2353 |
| 4.98 | 61 | 39 | 26.42 | 23.00 | 2.85 | 2.67 | 34.00 | 30.50 | 2716 |
| 5.95 | 56 | 44 | *21.44 | 22.90 | 1.97 | 1.65 | 26.50 | 30.00 | 2980 |
| 5.85 | 50 | 50 | 23.48 | 21.00 | 4.06 | 3.71 | 35.70 | 31.00<br>32.00 | 2917<br>3435 |
| 7.88 | 33 | 67 | 22.84 | 21.00 | 4.08 | 3.71 | 34.14 | 33.00<br>35.00 | 2998<br>3312 |
| 7.70 | 50 | 50 | 23.51 | 21.00 | 4.16 | 3.29 | 36.07 | 36.00 | 2366 |
| 7.08 | 59 | 41 | 24.15 | 23.00 | 3.83 | 3.70 | 36.06 | 32.00 | 3190 |
| 5.95 | 52 | 48 | 21.54 | 20.59 | 3.59 | 3.29 | 32.70 | 35.00 | 2966 |

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*Constituent falls below guaranty.

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. |
|---|---|---|
| | SCOTT FERTILIZER CO., ELKTON, MD. | |
| 3001 | Pure Ground Raw Bone, | W. H. Diehl, Northumberland, R. D., |
| | SWIFT & CO.. NEWARK, N. J. | |
| 2492 | Swift's Pure Bone Meal. | Thos. Haines & Co., Malvern, |
| | I. P. THOMAS & SONS CO., PHILADELPHIA, PA. | |
| 2985 | Pure Ground Bone. | W. J. Moyer, Greenville, |
| | EMIL WAHL. PHILADELPHIA. PA. | |
| 2486 | Emil Wahl's Warranted Pure Button Bone Meal. | S. K. Chambers & Bro., West Grove, |
| | THE ROBT. A. WOOLDRIDGE CO., BALTIMORE, MD. | |
| 2510<br>2959 | †Wooldridge's Pure Raw Bone. | J. W. Maxwell, E. Downingtown,<br>H. W. Taylor, Maryland Line, Md., |
| | YORK CHEMICAL WORKS, YORK, PA. | |
| 2526 | Dempwolf's Pure Ground Bone, | J. P. Stoltzfus, Elverson, |
| 2497 | Dempwolf's Raw Bone Meal, | Thos. Haines & Co., Aldham, |

†Composite sample.

FERTILIZERS—Continued.

| Moisture in 100 pounds. | Mechanical Analysis. |  | Chemical Analysis. |  |  |  | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Phosphoric Acid. |  | Nitrogen. |  |  |  |  |
|  | Diameter less than 1-50 inch "fine." | Diameter greater than 1-50 inch "coarse." | Found. | Guaranteed. | Found. | Guaranteed. |  |  |  |
| 5.38 | 44 | 56 | 22.86 | 21.50 | 3.61 | 3.30 | 33.06 | ...... | 3001 |
| 2.68 | 34 | 66 | 26.46 | 24.00 | *2.24 | 2.47 | 29.70 | 32.00 | 2492 |
| 5.63 | 74 | 26 | 23.39 | 23.00 | 3.16 | 2.46 | 33.86 | 27.00 | 2985 |
| 12.58 | 75 | 25 | 25.54 | 24.59 | *2.70 | 3.30 | 33.81 | 31.00 | 2486 |
| 7.38 | 64 | 36 | *20.42 | 21.50 | 3.79 | 3.70 | 33.44 | 34.00<br>31.50 | 2510<br>2959 |
| 5.05 | 58 | 42 | 27.48 | 23.00 | 2.69 | 2.47 | 34.00 | 30.00 | 2526 |
| 7.70 | 46 | 54 | 22.15 | 20.00 | 3.88 | 3.71 | 33.85 | 31.00 | 2497 |

*Constituent falls below guaranty.

## MISCELLANEOUS

| Sample number. | Manufacturer and Brand. | | Moisture in 100 pounds. |
|---|---|---|---|
| | AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. | | |
| 2973 | High Gade Dried Blood, | Keystone Grape Co., North East, | 9.43 |
| 2104 | Thomas Phosphate Powder (Basic Slag, | F. M. Roth, Clark's Summitt, | 0.13 |
| | AMERICAN REDUCTION CO., PITTSBURGH, PA. | | |
| 2387 | Ground Garbage Tankage, | D. U. [illegible] urg, | 3.38 |
| | ARMOUR FERTILIZER WORKS, BALTIMORE, MD. | | |
| 2103 | Dried Blood, | A. L. [illegible] rg, | 5.90 |
| | ASSOCIATED CHEMICAL CO., HAGERSTOWN, MD. | | |
| 3344 | Muriate of Potash, | Diehl [illegible] Diehl, Chambersburg | 7.60 |
| | BOWKER FERTILIZER CO., NEW YORK CITY. | | |
| 1976 | Sulphate of Potash, | Mur: [illegible] nesdale, | 0.25 |
| | H. C. BRICKER, BUTLER, PA. | | |
| 3149 | Animal Tankage, | [illegible] | 4.13 |
| | BUTLER BEEF AND PROVISION CO., BUTLER, PA. | | |
| 3514 | Tankage, | Bu[illegible] and Provision Co., Butle[illegible] | 8.13 |
| | COE MORTIMER CO., NEW YORK. | | |
| 2319 | Nitrate of Soda, | The I. W. Scott Co., Pittsburgh, | 1.59 |
| | FARMERS' FERTILIZER CO. OF AMERICA, PITTSBURGH, PA. | | |
| 3512 | Phosphatic Lime, the Soil Corrector, | J. M. Raub & Bro., Midway, | 1.23 |
| 3513 | Phosphate Lime, the Soil Corrector, | Robt. J. Wallace, Canonsburg, R. D. No. 3. | .63 |
| | EUREKA CHEMICAL CO., BALTIMORE, MD. | | |
| 300 | Nitrate of Soda, | Lewis Arnold, Pfantz Valley, | 4.18 |
| 301 | Muriate of Potash, | Lewis Arnold, Pfantz Valley, | 0.50 |
| | FEDERAL CHEMICAL CO., COLUMBIA, TENN. | | |
| 1650 | Tennessee Brown Phosphate Rock, | Direct from manufacturers, | 0.88 |
| | S. M. HESS & BRO., INC., PHILADELPHIA, PA. | | |
| 3113 | Muriate of Potash, | Ira Price, Everett, R. No. 7, | 1.43 |
| | D. B. MARTIN CO., PHILADELPHIA, PA. | | |
| 846 | Dried Blood, | Hershey Store Co., Hershey, | 11.75 |
| | THE MILLER FERTILIZER CO., BALTIMORE, MD. | | |
| 1348 | German Kainit, | Wm. Overdorff, Windsor, | 13.96 |
| | MOUNT PLEASANT FERTILIZER CO., MT. PLEASANT, TENN. | | |
| 2473 | Ground Tennessee Rock, | A. N. Yost, Bloomsburg, | 7.20 |
| | NITRATE AGENCIES CO., NEW YORK. | | |
| 2311<br>3362 | †Ground Tankage, | Dover's Farmers' Corporation, Dover,<br>M. C. Weaver, Millersburg, | 7.30 |
| | PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA. | | |
| 2325 | Pure Bone and Meat, | Jos. Taylor, Irwin, R. D., | 5.86 |
| | RASIN MONUMENTAL CO., BALTIMORE, MD. | | |
| 3308 | Genuine German Kainit, | Chas. Yaeckle, Patton, R. No. 1, | 4.85 |
| 114 | Sulfate of Potash, | Chas. Yaeckle, Patton, R. No. 1, | 0.20 |
| | READING BONE FERTILIZER CO., READING, PA. | | |
| 3441 | Kainit, | A. F. Baver, Hamburg, | 3.00 |

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†Composite sample.

# FERTILIZERS.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 10.30 | 9.87 | 50.17 | 44.00 | 2973 |
| ...... | ...... | ...... | 18.65 | 17.00 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 18.00 | 2404 |
| ...... | ...... | ...... | 2.88 | ...... | ...... | ...... | ...... | ...... | 2.22 | 2.06 | 14.61 | 11.00 | 2387 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 14.34 | 12.16 | 68.64 | 64.00 | 2103 |
| ...... | ...... | ...... | ...... | ...... | 50.30 | ...... | 50.30 | 50.00 | ...... | ...... | 44.75 | 50.00 | 3344 |
| ...... | ...... | ...... | ...... | ...... | ...... | 52.96 | 52.96 | 48.00 | ...... | ...... | 57.60 | 55.00 | 1976 |
| 4.89 | ...... | 8.26 | 13.15 | 12.00 | ...... | ...... | ...... | ...... | 4.90 | 4.50 | 34.51 | ........ | 3149 |
| ...... | ...... | ...... | 8.70 | ...... | ...... | ...... | ...... | ...... | 5.60 | ...... | 33.36 | 25.00 | 3514 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.41 | 15.00 | 58.98 | 65.00 | 2319 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.72 | 14.80 | 60.09 | ........ | 300 |
| ...... | ...... | ...... | ...... | ...... | 52.82 | ...... | 52.82 | 50.00 | ...... | ...... | 46.88 | ........ | 301 |
| ‡.32 | † | 1.86 | 2.18 | ...... | ...... | ...... | .35 | ...... | ...... | ...... | ...... | ........ | 3512 |
| ‡.27 | ...... | 1.46 | 1.73 | ...... | ...... | ...... | .27 | ...... | ...... | ...... | ...... | ........ | 3513 |
| ...... | ...... | ...... | *29.18 | 29.75 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 8.00 | 1650 |
| ...... | ...... | ...... | ...... | ...... | 52.78 | ...... | 52.78 | 49.00 | ...... | ...... | 46.88 | 45.00 | 3113 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 13.14 | 9.87 | 63.16 | 65.00 | 846 |
| ...... | ...... | ...... | ...... | ...... | 15.60 | ...... | 15.60 | 12.00 | ...... | ...... | 15.26 | 14.00 | 1343 |
| ...... | ...... | ...... | *26.49 | 28.00 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 8.00 | 2473 |
| ...... | ...... | ...... | 14.46 | 13.73 | ...... | ...... | ...... | ...... | 5.87 | 5.75 | 39.21 | 32.30<br>...... | 2311<br>3362 |
| ...... | ...... | ...... | 11.75 | 8.00 | ...... | ...... | ...... | ...... | 5.02 | 4.93 | 33.48 | 26.00 | 2325 |
| ...... | ...... | ...... | ...... | ...... | 12.26 | ...... | 12.26 | 12.00 | ...... | ...... | 12.41 | 14.00 | 3308 |
| ...... | ...... | ...... | ...... | ...... | ...... | 51.82 | 51.82 | 48.00 | ...... | ...... | 56.39 | 53.00 | 114 |
| ...... | ...... | ...... | ...... | ...... | 13.66 | ...... | 13.66 | 12.00 | ...... | ...... | 13.60 | 14.00 | 3441 |

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*Constituent falls below guaranty.

†Manufacturer states: "This is a mixture of bone phosphate of lime and lime with magnesia and manganese by our patented process."

‡Determined by Wagner method ("citric acid soluble").

## MISCELLANEOUS

| Sample number. | Manufacturer and Brand. | From Whom Sample Was Taken. | Moisture in 100 pounds. |
|---|---|---|---|
| | F. S. ROYSTER GUANO CO., BALTIMORE, MD. | | |
| 3466 | Genuine German Kainit, | Jos. T. King, Lawrenceville, | 3.29 |
| 3465 | Nitrate of Soda, | Jos. T. King, Lawrenceville, | 0.59 |
| 3464 | Sulphate of Potash, | Jos. T. King, Lawrenceville, | 0.85 |
| | J. G. REICHARD & BRO., ASHLAND, PA. | | |
| 3181 | Animal Tankage, | Lewis Schroeder, Barnesville, | 6.28 |
| | U. S. FERTILIZER CO., BALTIMORE, MD. | | |
| 272 | †German Kainit, | Biglerville Warehouse Co., Biglerville, | 1.28 |
| 1130 | | Wm. Eves, Jerseytown, | |
| 2020 | Sulphate of Potash, | New Providence Coal Co., New Providence. | 0.40 |
| 495 | †Nitrate of Soda, | A. J. Fidler, Secy., Rock, | 1.63 |
| 1025 | | C. B. Tyler, Meshoppen, | |

†Composite sample.

FERTILIZERS—Continued.

| Phosphoric Acid in 100 Pounds. | | | | | Potash in 100 Pounds. | | | | Nitrogen in 100 lbs. | | Computed commercial value of 2,000 pounds at Department rating. | Selling price of 2,000 pounds at point of selection. | Sample number. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Available. | | | Total. | | | | Total. | | | | | | |
| Found. | Guaranteed. | Insoluble. | Found. | Guaranteed. | Present as muriate. | Present as sulphate. | Found. | Guaranteed. | Found. | Guaranteed. | | | |
| ...... | ...... | ...... | ...... | ...... | 13.42 | ...... | 13.42 | 12.00 | ...... | ...... | 13.89 | 16.00 | 3466 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.72 | 15.00 | 60.09 | 65.00 | 3465 |
| ...... | ...... | ...... | ...... | ...... | ...... | 49.34 | 49.34 | 48.00 | ...... | ...... | 53.82 | 60.00 | 3464 |
| ...... | ...... | ...... | 15.06 | 9.16 | ...... | ...... | ...... | ...... | *5.49 | 6.18 | 33.29 | 28.50 | 3181 |
| ...... | ...... | ...... | ...... | ...... | 16.05 | ...... | 16.05 | 12.00 | ...... | ...... | 15.64 | 12.50<br>13.00 | 272<br>1130 |
| ...... | ...... | ...... | ...... | ...... | ...... | 51.86 | 51.86 | 48.00 | ...... | ...... | 56.44 | 48.00 | 2020 |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 15.88 | 14.80 | 60.34 | ......<br>60.00 | 495<br>1025 |

*Constituent falls below guaranty.

# INSTRUCTIONS TO AGENTS ENGAGED IN COLLECTING SAMPLES OF FERTILIZERS FOR THE DEPARTMENT OF AGRICULTURE OF PENNSYLVANIA.

Fertilizer manufacturers sometimes allege that there have been errors made on the part of our sampling agents in selecting samples for analysis. It is due to manufacturers, purchasers and this Department, that the greatest care shall be exercised on the part of all connected with this work, to insure that the samples are fairly taken, are properly labeled and sealed, and are sent to the chemist in exactly the condition in which the goods are found. The following instructions have therefore been prepared for the guidance of agents to which strict adherence is required.

1.—No sample shall be taken from the manufacturer's warehouse.

2.—No agent shall draw in the same season more than two samples of any one brand of fertilizer, unless for some special reason, which he shall state in his report; if a second sample be drawn the agent must satisfy himself that it is not a part of the same shipment from which the first sample was taken.

3.—Each agent shall make report from time to time in duplicate, giving the number of each sample taken in consecutive order, the name and address of the manufacturer, the name and address of the agent selling the goods from which the sample is taken, an EXACT copy of the name of the brand of fertilizer and the selling price per ton of 2,000 lbs. at point of selection. He shall then subscribe his name to each report and send one copy to the official chemist as hereinafter provided, and the other to the Secretary of Agriculture, at Harrisburg, Pa.

4.—Agents shall keep full memoranda of all the samples, stating the number of packages from which the sample is taken, together with such additional notes of information as may be of service for future reference in case the accuracy of their work is called in question.

5.—The sample for analysis must be taken from at least four sacks, the sampling tube to be run its full length diagonally from top to bottom through the center of the sack, turned two or three times to fill it, and the contents emptied upon the oil cloth provided for mixing. Mix the material drawn from the four sacks by lifting the corners of the cloth alternately so as to roll the substance back and forth. Level the well-mixed material with the spatula to a thickness of not more than one inch. By the aid of the spatula divide the flattened heap into quarters, of which two, diagonally opposite shall be scraped from the cloth, and the remaining two remixed by the rolling process and again leveled. Through the heap thus prepared make two channels, crossing at right angles by use of the sampling channel, which must be pushed close to the cloth under the fertilizer and lifted so as to remove a vertical section of the heap. At ONCE, empty the materials thus taken through the funnel into the sampling bottle and screw down tight the bottle cap, after making sure that its cork or fibre cap-lining is in place.

6.—The sample being properly secured, the agent shall write his name and his record number for the sample upon both the bottle and the carton labels. The bottle shall then be inserted in the carton and the latter IMMEDIATELY closed by drawing down the cover and inserting it in its place and putting a rubber band around the entire carton, the long way so as to hold the cover in place until the agent's seal can be applied.

7.—Place the cartons in the containers and when their number is complete, put on the cover; then place the tape around the container, once each way, and KNOT. Take your sealing wax and seal the tape to the container, by placing the sealing wax directly over the knot so as to secure the knot; then impress your seal and place in shipping case, enclose with them the agent's corresponding duplicate report, lock the case and ship it to the chemist.

8.—Agents must not use pencil in writing upon labels or in Record Book: Provided, however, that indelible pencil may be used if it makes a clearly legible impression and is not used when the paper, by reason of rain or other cause, is so moist as to cause the writing to blur.

9.—Agents, when practicable, will keep the Secretary of Agriculture informed in advance, of the points to be visited, so as to be promptly reached by telegraph or mail, if necessary.

# SPECIAL NOTICE.

This Department expects to continue the publication, early in each year, of a list of fertilizer manufacturers who have complied with the law of this State by filing with the Department the required analysis and paying the legal license fee, together with the trade names of the several brands for which such fees have been paid, so that dealers may be able to avoid making themselves liable to prosecution.

The policy of the Department for some time in the past was to bring prosecution against manufacturers, where it was possible to reach them, rather than against local dealers who are found selling unregistered goods, or goods that in other respects fail to meet the requirements of the law.

It was found, however, that in pursuing this method exclusively, we were sometimes subject to long delays before cases brought, came to trial, and as our witnesses are agents and chemists of the Department who are liable to change, it sometimes happened that before the cases were listed for trial they had gone to some other field and their presence in Court could not be secured.

For this reason prosecutions, when necessary, are now being instituted either against the manufacturers or persons selling goods that do not comply with the law as we may elect.

N. B. CRITCHFIELD,
Secretary of Agriculture.

Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

Bulletin No. 245.

# LIST OF
# Fertilizer Manufacturers and Importers

AND

Brands of Their Fertilizers for Which License to Sell in Pennsylvania During 1914 was Taken Out Prior to February 19, 1914.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

HARVARD LAW SCHOOL LIBRARY
JUN 26 1914
CAMBRIDGE, MASS.

Commonwealth of
Pennsylvania

# The Act of 1st May 1909, Commonly Referred to as "The New Fertilizer Law" Is as Follows:

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## No. 205.

## AN ACT

To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand or trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year: and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more than one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of

business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

## No. 95.

## AN ACT

**Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.**

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

# SPECIAL NOTICE.

The attention of local dealers and manufacturers' agents handling commercial fertilizers is called to the list published herewith, of manufacturers, together with a list of the several brands of fertilizers they have licensed for sale in this State during the year 1914.

Local dealers and agents should see that all brands of fertilizers sold, offered, or exposed for sale by them are licensed, for the reason that if they are sold, offered or exposed for sale without license first having been taken out, they are, together with the manufacturer, liable to the penalty prescribed in Section 5, of the Act of May 1, 1909, governing the manufacture and sale of commercial fertilizers in Pennsylvania. Dealers and agents are therefore cautioned not to sell or have in possession for sale any brand that has not been duly licensed, in compliance with the provisions of said Act. This is the only way in which they can protect themselves from personal liability in case fertilizers that are not registered, or upon which license fees have not been paid, are found in their possession or in the hands of others to whom they have sold the same.

N. B. Critchfield

*Secretary of Agriculture.*

Harrisburg, Pa., February 19, 1914.

# LIST OF FERTILIZER MANUFACTURERS AND BRANDS OF THEIR FERTILIZERS FOR WHICH LICENSE TO SELL IN PENNSYLVANIA DURING 1914 WAS TAKEN OUT PRIOR TO AND INCLUDING FEBRUARY 19, 1914.

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AHRENS FERTILIZER CO., LORANE, PA.

"Pure Bone Meal."

THE ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA.

"High Grade Truck & Garden Phosphate."
"High Grade Potato Phosphate."
"Complete Phosphate.
"Special $25.00 Phosphate."
"High Grade Phosphate & Potash."
"Economical Phosphate."
"Pure Ground Bone."

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY, NEW YORK CITY.

"12 Per Cent. Acid Phosphate."
"14 Per Cent. Acid Phosphate."
"16 Per Cent. Acid Phosphate."
"Gem Alkaline Phosphate."
"Penn Alkaline Phosphate."
"Shuler's Phosphate & Potash."
"Boss Potash Fertilizer."
"Big Crop Phosphate."
"Fruit Tree Invigorator."
"High Grade Potash Mixture."
"High Grade Phosphate & Potash."
"Superior Potash Mixture."
"Dead Shot Phosphate."
"Ammoniated Phosphate & Potash."
"Special Potash Mixture."
"10 Per Cent. Potash Mixture for Potatoes."
"Superior Compound."
"Peerless Vegetable & Grain Grower."
"Lion Crop Grower."
"High Grade Potash Compound."
"Complete Wheat & Hay Grower."
"Complete Manure with 10 Per Cent. Potash."
"Grass & Lawn Top Dressing."
"A No. 1 Top Dressing."

"Top Dresser for Grass."
"Fine Ground Bone."
"High Grade Ground Bone."
"Pure Raw Bone."
"Ground Tankage."
"Dry Ground Fish."
"Ground Untreated Phosphate Rock."
"High Grade Dried Blood."
"Nitrate of Soda."
"Thomas Phosphate Powder (Basic Slag)."
"Genuine German Kainit."
"Muriate of Potash."
"High Grade Sulphate of Potash."
"Keystone Grape Special (Sulphate)."
"Bone Meal."
"Old Reliable."
"Allen's Special for Wheat & Grass."
"Allen's Popular Phosphate."
"Bradley's Big Crop."
"Bradley's Alkaline Phosphate & Potash."
"Bradley's Circle Phosphate."
"Bradley's Magic Phosphate."
"Bradley's Niagara Phosphate."
"Bradley's New Method Fertilizer,"
"Bradley's B. D. Guano."
"Bradley's Superior Compound."
"Bradley's King Philip."
"Bradley's New Rival Fertilizer."
"Bradley's Bay State."
"Bradley's Unicorn."
"Bradley's Weymouth Staple Phosphate."
"Bradley's B. D. Sea Fowl Guano."
"Bradley's Half Century Fertilizer."
"Bradley's Maize Producer."
"Bradley's Sure Growth Phosphate."
"Bradley's Greyhound Fertilizer."
"Bradley's Potato & Vegetable Manure."
"Bradley's Tobacco Manure (Potash from Sulphate)."
"Canton Chemical Baker's Dissolved S. C. Phosphate."
"Canton Chemical Soluble Phosphate & Potash."
"Canton Chemical Soluble Alkaline Phosphate."
"Canton Chemical Eagle Phosphate."
"Canton Chemical Harrow Brand Crop Grower."
"Canton Chemical Resurgam Guano."
"Canton Chemical Baker's Special Wheat Corn & Grass Mixture."
"Canton Chemical Potato Manure."
"Canton Chemical Baker's Fish Guano."
"Canton Chemical Baker's Standard High Grade Guano."
"Canton Chemical C. C. C. Special Compound."
"Croker's Perfect Crop."
"Crocker's Dissolved Phosphate & Potash."
"Crocker's Globe Phosphate."
"Crocker's Paragon Phosphate."
"Crocker's General Crop Fertilizer."

"Crocker's Universal Grain Grower."
"Crocker's Complete Manure."
"Crocker's Root & Vine."
"Crocker's Nobsque Guano."
"Crocker's New Rival Fertilizer."
"Crocker's Century Fertilizer."
"Crocker's Harvest Jewel Fertilizer."
"Crocker's High Grade Special."
"Crocker's Wheat & Corn Fertilizer."
"Crocker's Potato, Hop & Tobacco Fertilizer."
"Crocker's Colonial Fertilizer."
"Crocker's Ammoniated Superphosphate."
"Crocker's High Grade Potato Fertilizer."
"Crocker's Special Potato Manure."
"Detrick's Dissolved S. C. Phosphate."
"Detrick's Soluble Phosphate & Potash."
"Detrick's Paragon Ammoniated Phosphate & Potash."
"Detrick's Imperial Compound."
"Detrick's Corn & Oats Fertilizer."
"Detrick's Standard Potash Fertilizer."
"Detrick's Royal Crop Grower."
"Detrick's Kangaroo Komplete Kompound."
"East India Great Crop."
"East India Ideal Mixture."
"East India Farm Favorite."
"East India Monarch Phosphate."
"East India Hawkeye Fertilizer."
"East India Economizer Phosphate."
"East India Pilgrim Fertilizer."
"East India Hustler Phosphate."
"East India Fruit Growers Friend."
"East India Tiger Brand."
"East India Improved Compound."
"East India 10 Per Cent. Vegetable & Potato."
"East India Wheat & Haymaker."
"East India Black Hawk Fertilizer."
"Great Eastern Unammoniated Wheat Special."
"Great Eastern Dissolved Acid Phosphate."
"Great Eastern Soluble Acid Phosphate & Potash."
"Great Eastern English Wheat Grower."
"Great Eastern General."
"Great Eastern High Grade Cabbage Grower."
"Great Eastern Wheat Special."
"Great Eastern Vegetable, Vine & Tobacco Fertilizer."
"Great Eastern Northern Corn Special."
"Lazaretto Dissolved Phosphate."
"Lazaretto High Grade Dissolved Phosphate & Potash."
"Lazaretto Ammoniated Phosphate."
"Lazaretto Special Potato Fertilizer."
"Lazaretto Special Ammoniated Compound."
"Lazaretto Crop Grower."
"Maryland Dissolved S. C. Phosphate."
"Maryland Bono Superphosphate."

"Maryland Linden Superphosphate."
"Maryland Alkaline Phosphate."
"Maryland O. K. Ammoniated Fertilizer."
"Maryland Ammoniated Phosphate."
"Maryland Special Compound for Potatoes & Tobacco."
"Michigan Carbon Works' Red Line Phosphate."
"Michigan Carbon Works' Wheat & Grass Fertilizer."
"Michigan Carbon Works' Red Line Complete Fertilizer."
"Michigan Carbon Works' General Crop Fertilizer."
"Michigan Carbon Works' Red Line Guano."
"Michigan Carbon Works' Homestead Fertilizer."
"Michigan Carbon Works' Red Line Phosphate with Potash."
"Milsom's Star Crop."
"Milsom's Crown Phosphate."
"Milsom's Eclipse Phosphate."
"Milsom's Imperial Phosphate."
"Milsom's Erie King Fertilizer."
"Milsom's Wheat, Oats & Barley."
"Milsom's Buffalo Guano."
"Milsom's Fancy Fruit Grower."
"Milsom's Soil Enricher."
"Milsom's Potato & Truck Grower."
"Milsom's Buffalo Fertilizer."
"Milsom's Potato, Hop & Tobacco Fertilizer."
"Milsom's Corn Fertilizer."
"Milsom's Medal Brand Manure."
"Milsom's Vegetable Fertilizer."
"Moro-Phillips' Soluble Phosphate."
"Moro-Phillips' Alkaline Phosphate."
"Moro-Phillips' Wheat Special."
"Moro-Phillips' Great Crop Fertilizer."
"Moro-Phillips' Farmers Phosphate."
"Moro-Phillips' C. & G. Complete Fertilizer."
"Moro-Phillips' Standard Guano."
"Moro-Phillips' Farmer's Potato Mixture."
"Moro-Phillips' Pure Phuine."
"Moro-Phillips' Ten Per Cent. Potato & Vegetable Manure."
"Moro-Phillips' Special Fertilizer."
"Moro-Phillips' Special Compound."
"North Western Choice Crop."
"North Western Electric Phosphate."
"North Western XXX Alkaline Phosphate."
"North Western High Grade Alkaline Phosphate."
"North Western Horseshoe Brand."
"North Western Success Phosphate."
"North Western Complete Compound."
"North Western Puritan Phosphate."
"North Western Challenge Fertilizer."
"North Western Farmers' Standard."
"North Western Pride of the North."
"North Western High Grade General Fertilizer."
"North Western Shawnee Phosphate."
"North Western Diamond Potash Mixture."
"North Western Soluble Fertilizer."

"Packers Union Wheat, Oats & Clover Fertilizer."
"Packers Union Superior Acid Phosphate."
"Packers Union Banner Wheat Grower."
"Packers Union American Wheat & Rye Grower."
"Packers Union Universal Fertilizer."
"Packers Union Potato Manure."
"Packers Union Animal Corn Fertilizer."
"Packers Union Gardner's Complete Manure."
"Quinnipiac Dissolved Phosphate & Potash."
"Quinnipiac Mohawk Fertilizer."
"Quinnipiac Climax Phosphate."
"Read's Boss Crop."
"Read's Champion Phosphate."
"Read's 10 and 8."
"Read's Practical Potato Special.
"Read's Leader Fertilizer."
"Read's Standard Superphosphate."
"Read's Pioneer Fertilizer."
"Read's All Crops Fertilizer."
"Read's King Philip Alkaline Guano."
"Read's Star Crop Producer."
"Read's Corn, Wheat & Rye."
"Read's Potash Compound."
"Read's Farmer's Friend Superphosphate."
"Reese's Elm Phosphate."
"Reese's Dissolved Phosphate of Lime."
"Reese's Grass & Grain."
"Reese's Wheat Special."
"Reese's High Grade Potash Mixture."
"Reese's Half & Half."
"Reese's Challenge Crop Grower."
"Reese's Pilgrim Fertilizer."
"Reese's Ammoniated Phosphate Mixture."
"Reese's Potato Manure."
"Reese's Harvest Queen."
"Reese's Mayflower."
"Sharpless & Carpenter's Soluble Phosphate & Potash."
"Sharpless & Carpenter's No. 2 for Grain & Grass."
"Sharpless & Carpenter's Royal Spring Mixture."
"Sharpless & Carpenter's Farmers' Brand Phosphate."
"Sharpless & Carpenter's Potato, Corn & Truck Guano."
"Sharpless & Carpenter's No. 1 Brand Phosphate."
"Sharpless & Carpenter's Gilt Edge Potato & Tobacco Manure."
"Sharpless & Carpenter's Dissolved Fertilizer for Potatoes & General Use."
"Sharpless & Carpenter's Soluble Tampico Guano."
"Susquehanna Superior Rock Phosphate."
"Susquehanna Soluble Phosphate."
"Susquehanna Alkaline Phosphate."
"Susquehanna Grain & Grass Producer."
"Susquehanna High Grade Phosphate & Potash."
"Susquehanna Crop Grower."
"Susquehanna XXV Phosphate."
"Susquehanna Ammoniated Phosphate."
"Susquehanna Potato Phosphate."

"Susquehanna Special Potato & Tobacco Manure."
"Susquehanna Animal Phosphate."
"Susquehanna High Grade Truck Mixture."
"Tygert-Allen's Star Dissolved Phosphate."
"Tygert-Allen's Star Soluble Phosphate & Potash."
"Tygert-Allen's Star Potato Grower."
"Tygert-Allen's Standard Brand Phosphate."
"Tygert-Allen's Ten Per Cent. Potato & Vegetable Manure."
"Tygert-Allen's Star Brand Phosphate."
"Wheeler's Peerless Acid Phosphate."
"Wheeler's All Crop Grower."
"Wheeler's Wheat & Clover Fertilizer."
"Wheeler's Fruit & Grain Grower."
"Wheeler's High Grade Phosphate & Potash."
"Wheeler's Special Vegetable Manure."
"Wheeler's Corn Fertilizer."
"Wheeler's Royal Wheat Grower."
"Wheeler's Potato Manure."
"Williams & Clark's Banner Crop."
"Williams & Clark's Triumph Phosphate."
"Williams & Clark's Fruit Tree Invigorator."
"Williams & Clark's Defiance Phosphate."
"Williams & Clark's Prolific Fertilizer."
"Williams & Clark's Elk Brand."
"Williams & Clark's Clark's Root Manure."
"Williams & Clark's Royal Phosphate."
"Williams & Clark's Good Grower."
"Williams & Clark's Panther Phosphate."
"Williams & Clark's Matchless Fertilizer."
"Williams & Clark's Americus Fertilizer."
"Williams & Clark's Springfall Phosphate."
'Williams & Clark's Great Planet Manure."
"Zell's Dissolved Phosphate."
"Zell's Electric Phosphate."
"Zell's Little Treasure."
"Zell's Economizer Phosphate."
"Zell's Hustler Phosphate."
"Zell's Ammoniated Superphosphate."
"Zell's Special Compound for Potatoes & Vegetables."

AMERICAN FERTILIZING COMPANY, BALTIMORE, MD.

"American Prize Truck Guano."
"American Excelsior Guano."
"American Fish & Bone Compound."
"American Eagle Crop Grower."
"American Champion Grain Grower."
"American Special Compound Guano."
"American Formula Wheat & Corn."
"American Special Potash Mixture."
"American Special Superphosphate."
"Ammoniated Crop Compound."
"Bob White Manure Compound."
"Dissolved Phosphate & Potash."

"High Grade Acid Phosphate."
"Pure Raw Bone."
'Nitrate Soda."
"Muriate Potash."
"Genuine German Kainit."
"Double Dissolved Phosphate & Potash."
"Double Extra Phosphate & Potash."

## ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD

"Cereal Phosphate."
"Star Phosphate."
"Phosphate & Potash No. 1."
"Potash Mixture."
"Sure Crop."
"Wheat & Clover."
"Banner Brand."
"Wheat Corn & Oats."
"Superior."
"Farmers Choice."
"Crop Grower."
"Royal Ammoniated."
"Wheat & Grass Special."
"Grain Grower."
"Fruit & Root Crop Special."
"High Grade Potato."
"Bone Meal."
"Muriate of Potash."
"Kainit."
"Nitrate of Soda."
"Lancaster County Tobacco Special."
"Pennsylvania Tobacco Grower."
"Pennsylvania Tobacco Special."
"Complete Potato."
"All Soluble."
"Bone Blood & Potash."
"Superphosphate Bone Blood & Potash."
"Pennsylvania Potato Special."
"Phosphate & Potash."
"8 Per Cent. Tankage."

## ATLANTIC FERTILIZER WORKS, BALTIMORE, MD.

"XX Special Compound for Potatoes."
"Standard Compound."
"Arrow Brand Special."
"Jumbo Crop Grower."
"Farmer's Alkaline Mixture."
"Dissolved Phosphate."
"Good Luck Special Potash Mixture."
"Cultivator.
"Royal Potato & Tomato Manure."
"Crop Producer."
"Golden Grain Grower."

R. S. AUCKER, SHAMOKIN, PA.

"Pure Ground Bone Meal."
"High Grade Bone & Slaughter House Phosphate."
"Grade B. Bone & Slaughter House Phosphate."
"Grade D. Bone & Slaughter House Phosphate."
"High Grade Potash Ammoniated Potato & Truck Phosphate."
"Economy Potash Phosphate."

BALTIMORE FERTILIZER CO., BALTIMORE, MD.

"Old Honesty."
"Honest 1-7-4."
"Honest Potato Grower."
"Honest Tankage, Rock & Potash."
"Honest 8 and 3."
"Honest 10 and 5."
"Honest Acid Phosphate."
"Honest Muriate of Potash."

J. H. BARTENSLAGER, STEWARTSTOWN, PA.

"Bartenslager's Champion."

J. W. BARWELL, WAUKEGAN, ILL.

"Barwell's Complete Lawn & Garden Fertilizer (Plant Grower & Land Renovator)."

BAUGH & SONS COMPANY, PHILADELPHIA, PA.

"Baugh's Raw Bone Meal—Warranted Pure."
"Baugh's Fine Ground Bone."
"Baugh's Export Bone with Potash."
"Baugh's Pure Raw Bone & Muriate Potash Mixture."
"Baugh's Pure Dissolved Animal Bones."
"Baugh's Animal Base & Potash Compound (For all Crops)."
"Baugh's Balanced Plant Food (A Superior Fertilizer for General Use)."
"Baugh's Commercial Super Phosphate (For General Use)."
"Baugh's Complete Animal Base Fertilizer."
"Baugh's Double Eagle Twenty Five Dollar Phosphate."
"Baugh's Energetic Super Phosphate."
"Baugh's Excelsior Guano."
"Baugh's General Crop Grower (For all Crops)."
"Baugh's Grand Rapid High Grade Guano."
"Baugh's High Grade Potato Grower."
"Baugh's New Process 10 Per Cent. Guano."
"Baugh's Highly Improved Tobacco Culture Manure."
"Baugh's Peninsula Grain Producer."
"Baugh's Peruvian Guano Substitute (For Potatoes and All Vegetables)."
"Baugh's Potato & Truck Special (For All Truck Crops)."
"Baugh's Special Potato Manure."
"Baugh's Wheat Fertilizer (For Wheat and Grass)."
"Baugh's High Grade Acid Phosphate."

"Baugh's 16 Per Cent. Acid Phosphate."
"Baugh's Ammoniated Soluble Alkaline."
"Baugh's Soluble Alkaline Super Phosphate."
"Baugh's 10 & 4 Phosphate and Potash Mixture."
"Baugh's 8 & 5 Special Alkaline Super Phosphate."
"Baugh's 10 & 8 Phosphate and Potash."
"Baugh's 12 & 5 Phosphate and Potash."
"The Wrapper Leaf Brand (A Special Manure for Seed Leaf Tobacco)."
"Nitrate of Soda."
"Muriate of Potash."
"Genuine German Kainit."
"High Grade Sulphate Potash."
"Baugh's High Grade Tankage."

BECKERT'S SEED STORE, PITTSBURGH, PA.

"Beckert's Odorless Lawn & Garden Fertilizer."

THE BERG COMPANY, PHILADELPHIA, PA.

"Berg's Special Bone Manure."
"Berg's Pure Dissolved Bone & Potash for Wheat & Grass."
"Berg's Vigor-Volo Bone and Potash."
"Berg's Standard Bone Manure."
"Berg's High Grade Potato Manure."
"Berg's Tobacco Manure."
"Berg's Pure Raw Bone Fine."
"Berg's Uneedit Brand."
"Berg's Ya-Goot Brand."
"Berg's Big Four."

BERGER BROTHERS, EASTON, PA.

"Peerless Phosphate."
"Farmers Favorite Super Phosphate."
"Lehigh Super Phosphate."
"Potato & Truck Special."

BOWKER FERTILIZER COMPANY, NEW YORK CITY.

"Bowker's Apex Phosphate."
"Bowker's Dissolved Phosphate."
"Bowker's Soluble Phosphate."
"Bowker's S. & P. Fertilizer."
"Bowker's Superphosphate with Potash."
"Bowker's Empire State Phosphate & Potash."
"Bowker's Ten & Eight."
"Bowker's Golden Harvest Fertilizer."
"Bowker's Ammoniated O. I. O. Phosphate."
"Bowker's Six Per Cent. Potato Fertilizer."
"Bowker's Potash Fertilizer."
"Bowker's Complete Compound."
"Bowker's Potash or Staple Phosphate."
"Bowker's Corn & Grain Grower.

"Bowker's Sure Crop Phosphate."
"Bowker's Ideal Potash Compound."
"Bowker's Farm & Garden Phosphate."
"Bowker's Special Crop Grower."
"Bowker's Ammoniated Food for Flowers."
"Bowker's Market Garden Fertilizer."
"Bowker's Potato & Vegetable Fertilizer."
"Bowker's Hill & Drill Phosphate."
"Bowker's Lawn & Garden Dressing."
"Stockbridge Special Complete Manure for Seeding Down, Permanent Dressing & Legumes."
"Stockbridge Special Complete Manure for Potatoes & Vegetables."
"Stockbridge Special Complete Manure for Corn and All Grain Crops."
"Stockbridge Special Complete Manure for Top Dressing and for Forcing."
"Bowker's Fresh Ground Bone."
"Bowker's Model Potash Mixture."
"Muriate of Potash."
"Nitrate of Soda."

BRADLEY & GREEN FERTILIZER CO., PHILADELPHIA, PA.

"Extra High Grade Potato Guano."

ELIAS S. BRUBACHER, RICHLAND, PA.

"Wheat and Grass Special."

CAMBRIA FERTILIZER CO., JOHNSTOWN, PA.

"Pure Fine Ground Bone Dust."
"Corn & Potato Manure."
"Standard Phosphate."
"B. B. Phosphate."

S. K. CHAMBERS & BRO., ELKVIEW, PA.

"Special Crop Grower."

THE CHESAPEAKE CHEMICAL CO., BALTIMORE, MD.

"C-C-Co's Golden Harvest."
"C-C-Co's English Mixture."
"C-C-Co's Farmer's Favorite."
"C-C-Co's Imperial Guano."
"C-C-Co's Reliable 10 & 4."
"C-C-Co's Corn & Buckwheat 6 & 3."
"C-C-Co's Dissolved Phosphate 14 Per Cent."

THE COE-MORTIMER COMPANY, NEW YORK CITY.

"E. Frank Coe's Wheat and Buckwheat Special."
"E. Frank Coe's Onandaga Special Fertilizer (For All Crops)."
"E. Frank Coe's Pennsylvania No. 1 Grain Special (For Wheat, Rye & Oats)."
"E. Frank Coe's Western New Yorker."

"E. Frank Coe's Columbian Corn and Potato Fertilizer."
"E. Frank Coe's Extra Special Potato Fertilizer & Fruit Grower."
"E. Frank Coe's Reliable Crop Grower."
"E. Frank Coe's Gold Brand Excelsior Guano."
"E. Frank Coe's Red Brand Excelsior Guano (For Market Gardening)."
"E. Frank Coe's High Grade Dissolved Phosphate & Potash."
"E. Frank Coe's Famous Prize Brand Grain & Grass Fertilizer."
"E. Frank Coe's Golden Harvest Fertilizer."
"E. Frank Coe's 12-5 Dissolved Phosphate & Potash."
"E. Frank Coe's High Grade Soluble Phosphate."
"E. Frank Coe's Universal Fertilizer."
"E. Frank Coe's Pennsylvania Tobacco Special (Sulphate)."
"Fine Ground Bone."
"Thomas Phosphate Powder (Basic Slag Phosphate)."
"Muriate of Potash."
"High Grade Sulphate of Potash."
"Nitrate of Soda."

COLUMBIA GUANO COMPANY, BALTIMORE, MD.

"Columbia 14 Per Cent. Acid Phosphate."
"Columbia High Grade 16 Per Cent. Acid Phosphate."
"Columbia Prize Crop Phosphate."
"Columbia Grass & Grain Grower."
"Columbia Premium Phosphate & Potash."
"Columbia Double Ten Potash Mixture."
"Columbia Potash Compound."
"Columbia Grain Special Fertilizer."
"Columbia General Crop Manure."
"Columbia Crop & Soil Improver."
"Columbia Special Potato Guano."
"Columbia Fish Phosphate & Potash."
"Columbia Special Potato Formula."
"Columbia Jersey Potato Grower."

THE CONSUMERS CHEMICAL CORPORATION, NEW YORK CITY.

"Consumer's Pure-Sure Potato Manure."
"Consumer's Potato & Vegetable Compound."
"Consumer's Special Sweet Potato Fertilizer."
"Consumer's Corn & Grain Grower."
"Consumer's High Grade Corn & Tomato Fertilizer."
"Consumer's Corn & Oats Compound."
"Consumer's All Crop Compound."

HENRY COPE & CO., LINCOLN UNIVERSITY, PA.

"Pure Bone Phosphate."
"Queen of Elk Valley Phosphate."
"Ammoniated Phosphate."
"Potato & Corn Phosphate."
"Wheat Grower & Complete Manure."
"Acid Phosphate."
"High Grade Soluble Phosphoric Acid & Potash."

"Regular Grade Soluble Phosphoric Acid & Potash."
"Old Guard Phosphate."
"Muriate of Potash."
"Nitrate of Soda."
"Kainit.

**JOSIAH COPE & CO., BALTIMORE, MD.**

"Josiah Cope & Co., Puro Bono Phosphate."
"Josiah Cope & Co. Potato and Tobacco Phosphate."
"Josiah Cope & Co. Try Me Fertilizer.
"Josiah Cope & Co. Ammoniated Phosphate."
"Josiah Cope & Co. Wheat and Grass Special."
"Josiah Cope & Co. High Grade Phosphate and Potash."
"Josiah Cope & Co. Soluble Phosphate and Potash."
"Josiah Cope & Co. Acidulated Phosphate."
"Josiah Cope & Co. Excelsior."
"Josiah Cope & Co. Universal Mixture for all Crops."
"Josiah Cope & Co. Pure Raw Bone."
"Josiah Cope & Co. Steamed Bone."

**G. & W. H. CORSON, PLYMOUTH MEETING, PA.**

"Corson's Prepared Lime & Potash."

**HENRY A. DREER, INC., PHILADELPHIA, PA.**

"Dreer's Peerless Plant Food."

**WALLACE DUNGAN, DOYLESTOWN, PA.**

"Peble Hill Home Made Animal Mixture."
"Potato Manure."
"Bone Flour."

**AMOS EBY & CO., LEAMAN PLACE, PA.**

"Pequea Economy."
"Pequea Ammoniated."
"Pequea High Grade."
"Pequea Special Potato."
"Pequea Valley Fertilizer."
"Pequea Crop Grower."
"Farmers Mixture."

**F. C. EISEMAN, MEADVILLE, PA.**

"General Crop Grower."

**EUREKA CHEMICAL COMPANY OF BALTIMORE CITY, BALTIMORE, MD.**

"Eureka High Grade Trucker."
"Eureka Potato & Vegetable."
"Eureka Farmers' Favorite."
"Eureka Complete Compound."
"Eureka Farmers' Success."

"Eureka Grain & Grass."
"Eureka Fish & Potash."
"Eureka Alkaline No. 5."
"Eureka Alkaline No. 8."
"Eureka Alkaline No. 2."
"Eureka Crop Grower."
"Eureka Soluble Phosphate."
"Muriate of Potash."

W. S. FARMER & CO., BALTIMORE, MD.

"W. S. Farmer & Co. Potato and Tobacco Phosphate."
"W. S. Farmer & Co. Harvest Queen."
"W. S. Farmer & Co. Clyde Brand."
"W. S. Farmer & Co. Empire Alkaline Phosphate."
"W. S. Farmer & Co. B. & P. Phosphate."
"W. S. Farmer & Co. Dissolved S. C. Phosphate."
"W. S. Farmer & Co. Pelician Guano."
"W. S. Farmer & Co. Diamond Back Brand."
"W. S. Farmer & Co. Climate Phosphate."
"W. S. Farmer & Co. Corn, Oats & Buckwheat."
"W. S. Farmer & Co. Standard Phosphate."

FARMERS' FERTILIZER AND FEED CO., WESTMINSTER, MD.

"High Grade Phosphate."
"No. 3 Phosphate."
"XX Phosphate."
"Carroll Phosphate."

FARMERS' FERTILIZER CO OF AMERICA, PITTSBURGH, PA.

"Phosphatic Lime"

THE FARMERS FERTILIZER WORKS, ELIZABETHTOWN, PA.

"Farmers I. X. L."
"Pride of Donegal."
"Potato Tobacco and Truck Manure."
"Special Potato & Tobacco Manure."
"Grain and Grass Special."
"Special Compound."
"Best Yet."
"Big Bonanza."
"Farmers Economy."
"Sure Crop."
"Acid Phosphate."

FEDERAL CHEMICAL COMPANY, COLUMBIA, TENN.

"Daybreak Tennessee Brown Phosphate Rock."

MAHLON FRETZ, SELLERSVILLE, PA.

"Fretz's Standard Phosphate."

JOSEPH R. GAWTHROP, KENNETT SQUARE, PA.

"Fine Ground Bone Meal."
"Complete Ammoniated Special Phosphate for Corn, Oats and Wheat."
"Special Potato Phosphate."
"Champion Fertilizer for Wheat and Grass."

J. C. GERBIG & SON, CHAMBERSBURG, PA.

"Pure Ground Bone."

GERMAN KALI WORKS, INC., NEW YORK CITY.

"Muriate of Potash."
"Sulfate of Potash."
"Kainit."

GRIFFITH & BOYD COMPANY, BALTIMORE, MD.

"Harvest Queen Phosphate."
"Spring Crop Grower."
"Farmers' Potato Manure."
"Ammoniated Bone Phosphate."
"Farmers Improved Phosphate."
"Special Grain Grower."
"Fish, Bone & Potash."
"Royal Potash Guano."
"Stable Manure Substitute."
"Valley Fertilizer."
"Cereal Plant Food."
"High Grade Acid Phosphate."
"XX Potash Manure."
"Peerless Fertilizer."
"Double Strength Tobacco Grower."
"Special Guano."
"Gilt Edge Crop Guano."
"Vegetable Bone."
"Monarch Brand."
"Royal 10 & 8 Mixture."
"Gem Phosphate."
"Muriate of Potash."
"Genuine German Kainit."
"Pure Fine Ground Bone Meal."
"Soft Ground Bone Meal."
"Pure Dissolved Animal Bone."

HAFLEIGH & COMPANY, PHILADELPHIA, PA.

"Pure Raw Bone Meal."

H. F. HAGER, QUAKERTOWN, PA.

"Farmers Favorite Phosphate."
"Panic Phosphate."

S. M. HESS & BROTHER, INC., PHILADELPHIA, PA.

"S. M. Hess & Brother's Brands High Grade Acid Phosphate."
"S. M. Hess & Brother's Brands Soluble Phosphate."
"S. M. Hess & Brother's Brands Emperor Phosphate."
"S. M. Hess & Brother's Brands Soluble Phosphate & Potash."
"S. M. Hess & Brother's Brands Standard Alkaline."
"S. M. Hess & Brother's Brands Peerless Phosphate."
"S. M. Hess & Brother's Brands Farmers' Grain & Clover Grower."
"S. M. Hess & Brother's Brands Jumbo Complete Formula."
"S. M. Hess & Brother's Brands Keystone Phosphate."
"S. M. Hess & Brother's Brands Special Corn Manure."
"S. M. Hess & Brother's Brands Wheat & Grass Manure."
"S. M. Hess & Brother's Brands Special Compound."
"S. M. Hess & Brother's Brands The Scientific Manure."
"S. M. Hess & Brother's Brands Ammoniated Super Phosphate."
"S. M. Hess & Brother's Brands Fish & Potash Manure."
"S. M. Hess & Brother's Brands Superior Potash Mixture."
"S. M. Hess & Brother's Brands Potato & Truck Manure."
"S. M. Hess & Brother's Brands Tobacco Manure."
"S. M. Hess & Brother's Brands Special Potato Manure."
"S. M. Hess & Brother's Brands Fine Ground Bone."
"S. M. Hess & Brother's Brands High Grade Ground Bone."
"S. M. Hess & Brother's Brands Muriate of Potash."
"S. M. Hess & Brother's Brands Nitrate of Soda."

THE HUBBARD FERTILIZER COMPANY, BALTIMORE, MD.

"Hubbard's Jersey Trucker."
"Hubbard's Royal Ensign."
"Hubbard's Standard Phosphate."
"Hubbard's Money Maker."
"Hubbard's Farmer's I. X. L."
"Hubbard's Jewel Phosphate."
"Hubbard's Climax Phosphate."
"Hubbard's Oriental Phosphate."
"Hubbard's Columbia Gem."
"Hubbard's Alkaline 12 & 5."
"Hubbard's Special Mixture 10 & 4."
"Hubbard's B. & P. 10 & 2."
"Hubbard's Corn & Buckwheat 6 & 3."
"Hubbard's 16 Per Cent. Phosphate."
"Hubbard's 14 Per Cent. Phosphate."
"Hubbard's Pure Bone Meal, 4½ & 50."
"Hubbard's Alkaline 10 & 8."
"Nitrate of Soda."
"Pure German Kainit."
"Muriate of Potash."

J. L. HUNTER & SON, PITTSTON, PA.

"Exeter Tankage."

**INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.**

"Dissolved Phosphate."
"General Crop."
"Phosphate and Potash."
"Extra Phosphate and Potash."
"Fish Guano."
"Farmers Choice."
"Ideal Wheat and Corn."
"Celery and Potato Special."
"High Grade Manure."
"Bone Meal."

**INTERNATIONAL AGRICULTURAL CORPORATION, THE PENNSYLVANIA FERTILIZER BRANCH, BUFFALO, N. Y.**

"Big Bonanza."
"Economy."

**INTERNATIONAL SEED CO., ROCHESTER, N. Y.**

"International Grain and Grass Fertilizer."
"International Potato and Truck Manure."
"International A 1 Special Manure."
"International Electric Fertilizer."

**THE JARECKI CHEMICAL COMPANY, SANDUSKY, OHIO.**

"Number One Formula."
"C. O. D. Phosphate."
"Pure Ground Bone."
"Square Brand Phosphate & Potash."
"Raw Bone & Phosphate Mixture."
"Fish, Phosphate & Potash, Tobacco & Potato Food."
"Super Phosphate & Potash.
"Tobacco & Truck Grower."
"High Potash Mixture."
"Black Soil Special."
"Fish Brand Truck Special."
"Lake Erie Guano with Phosphate & Potash."
"Black Diamond Fish Guano."
"Fish and Potash Truck Manure."

**T. S. KENDERDINE & SONS, NEWTOWN, PA.**

"Kenderdine's 'B' Phosphate."
"Kenderdine's Potato Phosphate."
"Kenderdine's Potato & Corn Phosphate."
"Kenderdine's Ammoniated Phosphate."
"Kenderdine's Nitrate of Soda."

KEYSTONE BONE FERTILIZER CO., INC., PHILADELPHIA, PA.

"Keystone Grain & Grass Manure."
"Keystone Special Penna. Grain Mixture."
"Keystone Excelsior Wheat Grower."
"Keystone Economy Potash Compound."
"Keystone General Manure."
"Keystone Ammoniated Superphosphate & Potash."
"Keystone Vegetable Guano."
"Keystone 20th Century Special."
"Keystone Royal Corn & Potato Manure."
"Keystone Standard Potato Manure."
"Keystone Supreme Potato & Truck Manure."
"Keystone 8 and 5."
"Keystone 10 and 2."
"Keystone Corn & Cereal Grower."
"Keystone Gold Medal Special."

FOR THE KEYSTONE GRANGE EXCHANGE, MANSFIELD, PA.

"4-7-8 Grangers' Ideal Potato Grower."
"2-8-10 Grangers' Favorite."
"1-8-4 Grangers' Choice."
"10-8 Grangers' Special Grain Mixture."
"Nitrate Soda."

THE LANCASTER BONE FERTILIZER COMPANY, LANCASTER, PA.

"Potato, Tobacco & Truck Manure."
"Scientific Animal Bone Compound."
"Ground Bone."
"Keystone Standard."
"Independent Grain Grower."
"Diamond."
"Special Guano."
"Complete Ammoniated Bone Manure."
"Harvest King."
"Truckers Success."
"Potato, Fruit & Vegetable."
"Special Grange Mixture."
"Farmers Economy."
"Animal Tankage & Potash."
"Corn, Grass & Wheat Special."

THE LANCASTER CHEMICAL COMPANY, LANCASTER, PA.

"No. 1 Tobacco and Vegetable."
"No. 2 Dewey Brand."
"No. 3 Pure Dissolved Animal Bone and Potash."
"No. 5 Flag Brand."
"No. 6 Hard Times."
"No. 8 Acid Phosphate."
"No. 9 Bone Meal."
"No. 10 Economist."
"No. 11 Keystone Brand."

"No. 13 Special Potash Manure."
"No. 14 Wheat and Grass."
"No. 15 General Crop Special."
"No. 16 Phosphoric Acid and Potash Special."
"No. 17 Wrapper Leaf Special."
"No. 19 Potato Special."

### LEBANON FERTILIZER WORKS, S. M. & H. D. LEVAN, PROPRIETORS. LEBANON, PA.

"Levan's Special Truck Fertilizer."
"Levan's Special Potato & Tobacco Fertilizer."
"Levan's Royal Potash Compound Fertilizer."
"Levan's Wheat & Grass Fertilizer."
"Levan's Wheat & Grass Special Fertilizer."
"Levan's Special Corn Fertilizer."
"Levan's General Crop Grower Fertilizer."
"Levan's Harvest Queen Fertilizer."
"Levan's Special Compound for Tobacco Fertilizer."
"Levan's Improved Top Dresser for Grass."
'Levan's Superphosphate & Potash Fertilizer."
"Levan's Special Mixture Fertilizer."
"Levan's Acid Phosphate."
"Levan's Pure Fine Ground Bone Meal."
"Muriate of Potash."
"Nitrate of soda."

### LISTERS AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.

"Listers Excelsior Guano."
"Listers Buyers' Choice Acid Phosphate."
"Listers Plant Food."
"Listers Dissolved Phosphate & Potash."
"Listers Potash Mixture."
"Listers Grain & Grass Fertilizer."
"Listers Atlas Brand Alkaline Fertilizer."
"Listers Golden Sheaf."
"Listers Special Crop Producer."
"Listers U S Superphosphate."
"Listers G. Brand."
"Listers Reliance."
"Listers Grass & Oat Fertilizer."
"Listers Harvest Queen Phosphate."
"Listers Success Fertilizer."
"Listers Special Fertilizer for Tomatoes."
"Listers Wheat & Rye Fertilizer."
"Listers Corn & Potato Fertilizer."
"Listers Special Wheat Fertilizer."
"Listers Potato & Corn No. 2 Fertilizer."
"Listers Ammoniated Dissolved Superphosphate."
"Listers Special Tobacco Fertilizer."
"Listers Standard Pure Superphosphate of Lime."
"Listers 3-6-10 for Potatoes."
"Listers Potato Manure."

"Listers Celebrated Ground Bone & Tankage Acidulated."
"Listers Bone Medal."
"Listers Special 10 Per Cent. Potato Fertilizer."
"Listers 10 Per Cent. Alkaline Potato Fertilizer."
"Listers Phosphoric Acid & Potash."
"Listers Crescent Complete Manure."
"Listers New York Special Fertilizer."
"Listers Superior Dissolved Phosphate & Potash."
"Listers Special 10 Per Cent. Fertilizer."
"Listers Pennsylvania Special."
"Listers 10 Per Cent. Potato Grower."
"Listers High Grade Acid Phosphate."
"Listers High Grade Dry Blood."
"Listers Oneida Special."
"Nitrate of Soda."
"High Grade Sulphate of Potash."
"Genuine German Kainit."
"Muriate of Potash.'

FREDERICK LUDLAM COMPANY, BALTIMORE, MD.

"Ludlam's Cecrops Fertilizer Potato & Tobacco."
"Ludlam's Cecrops Fertilizer Standard."
"Ludlam's Cecrops Fertilizer A B F Brand."
"Ludlam's Cecrops Fertilizer Spring Special."
"Ludlam's Cecrops Fertilizer Standard Potash."
"Ludlam's Cecrops Fertilizer Harvest Queen."
"Ludlam's Cecrops Fertilizer No. 2 for Grain & Grass."
"Ludlam's Cecrops Fertilizer C & G Brand."
"Ludlam's Cecrops Fertilizer On Top."
"Ludlam's Cecrops Fertilizer Phosphate & Potash."
"Ludlam's Cecrops Fertilizer I X L Brand."
"Ludlam's Cecrops Fertilizer Wheat Special."
"Ludlam's Cecrops Fertilizer Economy."
"Ludlam's Cecrops Fertilizer Dissolved Phosphate."

THE MAPES FORMULA & PERUVIAN GUANO CO., NEW YORK CITY.

"Mapes Potato Manure."
"Mapes Tobacco Starter Improved."
"Mapes Economical Potato Manure."
"Mapes Tobacco Manure Wrapper Brand."
"Mapes Vegetable or Complete Manure for Light Soils."
"Mapes Average Soil Complete Manure."
"Mapes Corn Manure."
"Mapes Complete Manure 'A' Brand."
"Mapes Complete Manure for General Use."
"Mapes Cereal Brand."
"Mapes Grain Brand."
"Mapes General Crop Brand."
"Mapes Complete Manure 10 Per Cent. Potash."
"Mapes Top Dresser Improved Full Strength."
"Mapes Top Dresser Improved Half Strength."

NOAH MARKEL, SEITZLAND, PA.

"Markel's Ammoniated Phosphate."
"Markel's Potato Grower."
"Markel's A. C. C. Phosphate."
"Markel's Electric Phosphate."

D. B. MARTIN CO., PHILADELPHIA, PA.

"Martin's Pure Raw Bone Meal."
"Martin's Pure Ground Bone."
"Martin's Pure Dissolved Animal Matter."
"Martin's Pure Animal Bone & Potash."
"Martin's Potash & Soluble Phosphate No. 1."
"Martin's Potash & Soluble Phosphate No. 2."
"Martin's Potash & Soluble Phosphate No. 3."
"Martin's Potash & Soluble Phosphate No. 4."
"Martin's Acid Phosphate."
"Martin 7 Per Cent. Guano."
"Martin's Gilt Edge Potato Manure."
"Martin's Claremont Vegetable Grower."
"Martin's Bull Head Fertilizer for Cotton & Tobacco."
"Martin's Corn & Cereal Special."
"Martin's Special Potato Manure."
"Martin's One Eight & Four."
"Martin's Dissolved Organic Compound."
"Martin's Sure Grower."
"Martin's Crop Producer."
"Martin's Prize Potato."
"Martin's Special Compound."
"Martin's Extra Sure Grower."
"Martin's Special Mixture."
"Martin's Early Truck & Vegetable Grower."

FREDERICK MEHRING, BRUCEVILLE, MD.

"Twenty Six Dollar Phosphate."
"General Crop Grower."
"Potash & Phos. Acid."
"Acid Phosphate."

HENRY F. MICHELL CO., PHILADELPHIA, PA.

"Michell's High Grade Ammoniated Phosphate."
"Michell's Pure Raw Bone Meal "Special Grade."
"Michell's Hi-Grade Potato Phosphate."
"Michell's Fine Ground Bone Meal."

THE MILLER FERTILIZER CO., BALTIMORE, MD.

"Standard Phosphate."
"Ammoniated."
"Special Potato Fertilizer."
"Hustler Phosphate."
"W. G. Phosphate."
"Pimlico."
"Clinch Phosphate."
"Acid Phosphate."
"Club Brand."
"Harvest Queen Phosphate."
"Potato & Vegetable Grower."
"Millers Potash Mixture."
"M. B. S."
"Farmers Profit."
"Special Alkaline."
"Special Tobacco Gr."
"Special."
"Kainit."

MT. PEASANT FERTILIZER CO., INC., MT. PLEASANT, TENN.

"Mt. Pleasant Untreated Phosphate."

MOWREY-LATSHAW HDW. CO., SPRING CITY, PA.

"Clover Brand Fertilizer."

NASSAU FERTILIZER COMPANY, NEW YORK CITY.

"Soluble Phosphate."
"Reliance Alkaline Phosphate."
"Royal Mixture."
"Grass & Grain Fertilizer."
"Potash & Phosphate."
"Tenn & Eight Special."
"Wheat & Grass Grower."
"General Favorite."
"Old Hickory."
"Plow Brand."
"Common Sense Potato Manure."
"Special Potato Fertilizer."
"Nassau Practical."
"Gladiator Truck & Potato."

NITRATE AGENCIES COMPANY, NEW YORK CITY.

"Nitrate of Soda."
"High Grade Acid Phosphate."
"Ground Bone."

"Ground Tankage."
"Basic Slag (H. A. Brand) Thomas Phosphate Powder."
"Dried Blood."
"Acid Phosphate."

G. OBER & SONS CO., BALTIMORE, MD.

"Obers Big (4) Four Special Mixture."
"Obers Stag Guano."
"Obers Special Plant Food."
"Obers Over Land Special Mixture."
"Obers Diss. Phosphate and Potash."
"Obers Standard Potash Compound."
"Obers Dissolved Phosphate."
"Obers Indep. Amm. Super. Phosphate."
"Obers Sea Island Fish Guano."
"Obers Farmers Mixture."
"Pure Raw Bone Meal."
"Muriate of Potash."
"Obers Red Seal Special Tobacco Guano."

OXFORD PACKING WORKS, OXFORD, PA.

"O. P. W. No. 1."
"O. P. W. No. 2."
"O. P. W. No. 4."

OYLER & SPANGLER, GETTYSBURG, PA.

"Gettysburg."
"Acidless."

PAN AMERICAN FERTILIZER CO., NEW YORK CITY.

"General Grain Grower."
"Orchard & Fruit Special."
"Market Garden Standard."

PATAPSCO GUANO CO., BALTIMORE, MD.

"Superior Top Dresser."
"Columbian Guano for Truck, Potatoes & Tobacco."
"Grange Mixture."
"Coon Brand Guano."
"Sea Gull Guano."
"Baltimore Soluble Phosphate."
"Battle Ax Phosphate."
"Genuine German Kainit."
"Muriate of Potash."
"Nitrate of Soda."
"Patapsco Early Trucker for Quick Growth."
"Patapsco Best Grade Fertilizer."

"Patapsco Special Wheat Compound—Animal Bone Base."
"Patapsco Premium Superphosphate."
"Patapsco Potato Manure."
"Patapsco Tobacco & Potato Fertilizer."
"Patapsco Fish Guano."
"Patapsco Corn & Tomato Fertilizer."
"Patapsco Crop Feeder."
"Patapsco Grain & Grass Producer."
"Patapsco General Crop Producer."
"Patapsco B. B. & P. Brand."
"Patapsco High Grade Phosphate & Potash."
"Patapsco Superior Alkaline Manure."
"Patapsco Corn Oats & Clover Compound."
"Patapsco Soluble Phosphate & Potash."
"Patapsco Alkaline Plant Food."
"Patapsco Phospo Potash."
"Patapsco Pure Dissolved S. C. Phosphate."
"Patapsco Pure Ground Bone."

J. D. PERKIN'S, COATESVILLE, PA.

"Perkin's Monarch Phosphate."
"Perkin's Special Bono Manure."
"Perkin's Globe Phosphate."
"Perkin's Pure Bone Meal."

PETERS PACKING CO., INC., McKEESPORT, PA.

"Tube City Brand."
"Peters Producer Brand."

VALENTINE PETROSKEY & SON, LATROBE, PA.

"Petroskeys Complete Fertilizer."

PIEDMONT-MT. AIRY GUANO CO., BALTIMORE, MD.

"Piedmont Pennsylvania Grain Grower."
"Piedmont Pennsylvania Potato Producer."
"Piedmont Economy."
"Piedmont Succeeds."
"Piedmont Farmers Favorite."
"Piedmont Special Potash Mixture."
"Piedmont Soluble Phosphate & Potash Mixture."
"Piedmont 14 Per Cent. Acid Phosphate."
"Piedmont Perfection Guano."
"Piedmont Farmers Potash Mixture."
"Piedmont 10 Per Cent. Potash Mixture."
"Insula Guano for All Crops."
"Levering's Standard."
"Levering's Ammoniated Bone."
"Levering's Harvest Queen."
"Levering's I X L Crop Grower."

PITTSBURGH PROVISION & PACKING COMPANY, PITTSBURGH, PA.

"No. 1 Pure Raw Bone Meal."
"Pure Raw Bone Meal."
"Crescent Butchers' Ground Bone."
"Pure Bone & Meat."
"Special Potato Fertilizer."
"Corn & Potato Fertilizer."
"Keystone Fertilizer."
"Lawn Fertilizer."
"Guano Fertilizer."
"Phosphate & Potash."
"Acid Phosphate."
"Nitrate of Soda."
"Pure Bone with Potash."
"Smiths' Grower, Mfg. for A. W. Smith Co., Ptgh., Pa."
"Smith's Mixer, Mfg. for A. W. Smith Co., Ptgh., Pa.
"Ten and Four Fertilizer."

THE POLLOCK FERTILIZER CO., BALTIMORE, MD. BY THE AMERICAN AGRICULTURAL CHEMICAL CO.

"The Pollock Fertilizer Co. Special Potato and Tobacco Fertilizer."
"The Pollock Fertilizer Co. Ammoniated Super Phosphate."
"The Pollock Fertilizer Co. Special Wheat & Corn Fertilizer."
"The Pollock Fertilizer Co. Crop Invigorator."
"The Pollock Fertilizer Co. Owl Brand Guano."
"The Pollock Fertilizer Co. Star Alkaline Phosphate."
"The Pollock Fertilizer Co. Sun Guano."
"The Pollock Fertilizer Co. Dissolved Phosphate and Potash."
"The Pollock Fertilizer Co. Soluble Phosphate."
"The Pollock Fertilizer Co. Victor Brand Phosphate."
"The Pollock Fertilizer Co. Dissolved S. C. Phosphate."
"The Pollock Fertilizer Co. Pure Raw Bone."
"The Pollock Fertilizer Co. Soft Ground Bone."

PUGH AND LYONS, OXFORD, PA.

"Ground Raw Bone."
"Bone Phosphate."
"B. R. P. Phosphate."
"Potato Phosphate."

RASIN-MONUMENTAL COMPANY, BALTIMORE, MD.

"Rasin's Indian Brand for Tobacco."
"Rasin's Vegetable Special."
"Rasin's X X X Fertilizer."
"Rasin's Royal Fish Bone & Potash."
"Rasin's Empire Guano."
"Rasin's Best Wheat & Grass Producer."
"Rasin's I X L Fertilizer."

"Rasin's Genesee Valley Root Manure."
"Rasin's Nitro Top Dresser."
"Rasin's Special for Vines & Vegetables."
"Rasin's National Crop Compound."
"Rasin's United Grain Grower."
"Rasin's Wheat Corn & Oats Mixture."
"Rasin's Triple Phosphate & Potash."
"Rasin's High Grade Phosphate & Potash."
"Rasin's Wheat & Truck Mixture."
"Rasin's Special Phosphate & Potash."
"Rasin's Phosphate & Potash Fertilizer."
"Rasin's Wheat Potash Mixture."
"Rasin's Half & Half Mixture."
"Rasin's Special Formula for Corn & Buckwheat."
"Rasin's Acid Phosphate."
"Muriate Potash."
"Nitrate Soda."
"Pure Raw Bone."
"Raw Bone."
"Sulphate Potash."
"Genuine German Kainit."
"Monumental Potato Manure."
"William Penn Crop Grower."

READING BONE FERTILIZER COMPANY, READING, PA.

"Reading Prize Winner."
"Truck, Fruit Tree, Vine, Potato & Tobacco Grower."
"Gilt Edge Potato and Tobacco Grower."
"Farmers Union Fertilizer."
"Reading All Crop Special."
"Sterling Potato Grower."
"Reading Special Potato & Tobacco Manure."
"Farmers Tankage & Potash for Corn Grain & Grass."
"Reading Special Grain & Grass Producer."
"Reading Harvest Queen."
"Dissolved Animal Matter."
"Soluble Dissolved Phosphate."
"Acid Phosphate 14 Per Cent."
"Soluble Phosphate & Potash."
"Alkaline Phosphate & Potash."
"High Grade Potash Mixture."
"Economy Brand."
"Pure Raw Bone."
"Nitrate of Soda."
"Muriate of Potash."
"Schuylkill Valley Favorite for Grain & Grass."
"Never Fail Crop Grower."
"Blood Meat & Potash Mixture."
"Tobacco & Truck Special."
"Kainit."
"Reading Twelve & Five."
"Pure Bone Meal."

ESTATE OF JACOB REESE, DARBY, PA., BY DELAWARE CO. TRUST SAFE DEPOSIT & TITLE INS. CO., CHESTER, PA.

"Odorless Slag Phosphate."

ROBERT A. REICHARD, ALLENTOWN, PA.

"Truckers' Favorite."
"Improved Top Dresser."
"Raw Bone Meal."
"Steamed Bone Meal."
"Lehigh Potato Manure."
"Golden Harvest Phosphate."
"Surpass Phosphate."
"Peerless Phosphate."
"Superior Phosphate."
"Little Giant Phosphate."
"Farmers' Favorite."
"Acid Phosphate."
"Muriate of Potash."

THE REINDOLLAR CO., TANEYTOWN, MD.

"Economy Fertilizer."

F. S. ROYSTER GUANO CO., BALTIMORE, PA.

"Royster's 14 Per Cent. Acid Phosphate."
"Royster's High Grade 16 Per Cent. Acid Phosphate."
"Royster's Alkaline Phosphate."
"Royster's Bumper Crop Phosphate."
"Royster's Peerless Grain & Grass Grower."
"Royster's XXX Alkaline Phosphate."
"Royster's Special Fruit & Crop Grower."
"Royster's H. G. Potash Mixture."
"Royster's Superior Potash Mixture."
"Royster's Farmers' Delight Fertilizer."
"Roysters Universal Crop Grower."
"Royster's Lehigh Potato Grower."
"Royster's Wheat Oats & Barley Fertilizer."
"Royster's Imperial Formula."
"Royster's General Crop Fertilizer."
"Royster's Seeding Down Special Fertilizer."
"Royster's Ammoniated Potash Compound."
"Royster's Prolific Potato Producer."
"Royster's Big Yield Potato Producer."
"Royster's Harvest King Fertilizer."
"Royster's Fish Flesh & Fowl."
"Royster's Champion Crop Compound."
"Royster's Challenge Complete Compound."
"Royster's Big Chief Tobacco Guano."

"Royster's Gold Seal Potato & Cabbage Special."
"Royster's Corn & Hop Special Fertilizer."
"Royster's Practical Truck Guano."
"Royster's Complete Potato Manure."
"Royster's Excellenza Tobacco Guano."

SCHAAL-SHELDON FERTILIZER CO., BUFFALO, N. Y.

"Dissolved Phosphate."
"Dissolved Phosphate with Extra Potash."
"Empire."
"Superior."
"Farmers' Favorite."
"Guano."
"Schall's Standard."
"Schall's Corn & Potato."
"Truckers' Manure."
"High Grade Ground Bone."
"Complete Fertilizer with Extra Potash."
"Ten & Eight."

THE SCOTT FERTILIZER CO., ELKTON, MD.

"Scott Sure Growth Superphosphate."
"Scott's Sure Growth Compound."
"Scott's Potato Grower."
"Scott's Potato & Truck Special."
"Scott's Grain Special."
"Scott's Wheat & Grass Grower."
"Scott's Corn & Oats Grower."
"Scott's Standard Phosphate."
"Scott's Sure Crop Grower for Wheat & Grass."
"Scott's Pure Ground Raw Bone."
"Scott Tip Top & Potash."
"Scott's Soluble Phosphate & Potash 12-5."
"Scott's Tip Top Soluble Phosphate."
"Scott's Soluble Phosphate & Potash 12-3."
"Fritch's Special."
"Alkaline Phosphate 8-5."

M. L. SHOEMAKER & CO., LIMITED, PHILADELPHIA, PA.

"Shoemaker's Special Ten Per Cent. Potato Fertilizer No. 1."
"Shoemaker's Special Ten Per Cent. Potato Fertilizer No. 2."
"Shoemaker's Swift-Sure Guano for Tomatoes, Truck and Corn."
"Shoemaker's Swift-Sure Guano for Fall Trade."
"Shoemaker's Dissolved Phosphate and Potash."
"Shoemaker's New Jersey Special for Oats."
"Shoemaker's New Jersey Special for Wheat and Clover."
"Shoemaker's Wheat Fertilizer Special No. 2."

"Shoemaker's Pure Raw Bone Meal."
"Swift-Sure Super-Phosphate for Potatoes."
"Swift-Sure Super-Phosphate for Tobacco."
"Swift-Sure Super-Phosphate for General Use."
"Swift-Sure Bone Meal."
"Good Enough Super-Phosphate."
"Echo Super-Phosphate."
"The Twenty Three Dollar Super-Phosphate."
"Dissolved South Carolina Rock."

### F. A. SIMONS BROTHERS, MAUD, PA.

"The Farmers Favorite High Grade Phosphate for Truck and Corn."
"The Farmers Favorite High Grade Phosphate for General Use."
"The Farmers Favorite High Grade Potato Special Phosphate."

### THE SMITH AGRICULTURAL CHEMICAL CO., COLUMBUS, OHIO.

"Ohio Farmers Alkaline Phosphate."
"Ohio Farmers Soluble Phosphate & Potash."
"Ohio Farmers Climax Phosphate."
"Ohio Farmers Wheat Maker & Seeding Down."
"Ohio Farmers Corn Oats & Wheat Fertilizer."
"Ohio Farmers Ammoniated Phosphate & Potash."
"Ohio Farmers Excelsior Phosphate."
"Ohio Farmers Potato & Tobacco Special."
"Black Soil Formula."
"Special Potato Formula."
"Ground Bone."
"Bone Meal Phosphate & Potash."

### H. H. SMYSER, YORK, PA.

"Ammoniated Chicago Bone Tankage."

### FOR SOUTHERN FERTILIZING CO., YORK, PA. BY AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY.

"Southern Fertilizing Co. Dissolved Phosphate."
"Southern Fertilizing Co. Ox Brand Phosphate and Potash."
"Southern Fertilizing Co. Farmers Mixture."
"Southern Fertilizing Co. Special Brand for all Crops."
"Southern Fertilizing Co., Royal Wheat & Grass Grower."
"Southern Fertilizing Co. General Crop Grower."
"Southern Fertilizing Co. Farmers Choice Brand."
"Southern Fertilizing Co. Queen of the Harvest."
"Southern Fertilizing Co. Special Potato Grower."
"Southern Fertilizing Co. Wheat, Corn & Grass Grower."
"Southern Fertilizing Co. Ammoniated Dissolved Fertilizer."
"Southern Fertilizing Co. Potato, Truck, & Tobacco Fertilizer."

STANDARD GUANO CO., BALTIMORE, MD.

"Special Alkaline Compound."
"Great Grain Grower."
"Jewel Mixture."
"XX Potash Mixture."
"Extra High Grade Acid Phos."
"Farmers Champion."
"Standard High Grade Acid Phosphate."
"Standard Mammoth Potato Grower."

SWACK'S FERTILIZER WORKS, DUBOIS, PA

"Swack's Potato & Truck."
"Swack's Special Potato."
"Swack's Special Top Dressing."
"Swack's Grain & Corn."
"Swack's Grain Grower."
"Swack's Wheat."
"Swack's Corn Special."
"Swack's General Crop Grower."
"Swack's Bone Meal."
"Swack's High Grade Tankage."
"Swack's Phosphate."
"Swack's Super Phosphate."
"Swack's Acid Phosphate."
"Swack's Bone & Potash."
"Muriate of Potash."
"Nitrate of Soda."

SWIFT & COMPANY, BALTIMORE, MD.

"Swift's Pure Prolific."
"Swift's Pure Grain Fertilizer."
"Swift's Pure Red Steer."
"Swift's Pure Truck Grower."
"Swift's Pure Corn, Wheat & Oats Grower."
"Swift's Pure Diamond C."
"Swift's Pure Golden Grain Grower.
"Swift's Pure Onion, Potato & Tobacco."
"Swift's Pure Special Potato Fertilizer."
"Swift's Pure Diamond A."
"Swift's Pure Diamond E."
"Swift's Pure Diamond D."
"Swift's Pure Early Potato & Vegetable Grower."
"Swift's Pure Potato, Celery & Onion."
"Swift's Pure Diamond H."
"Swift's Pure Diamond G."
"Swift's Pure High Grade Phosphate & Potash."
"Swift's Pure Special Phosphate & Potash."
"Swift's Pure Plantation Phos. & Potash."
"Swift's Pure Diamond F."
"Swift's Pure High Grade Acid Phosphate."

"Swift's Pure Garden City Phosphate."
"Swift's Pure Bone Meal."
"Swift's Pure Superphosphate."
"Swift's Pure Nitrate of Soda."
"Swift's Pure Muriate of Potash."

J. M. TEMPLIN, HONEY BROOK, PA.

"No. 4 Atlas Brand Fertilizer."
"No. 8 High Grade Potash Manure."
"No. 5 High Grade Acid Phosphate."

I. P. THOMAS & SON CO., PHILADELPHIA, PA.

"Tip Top Superphosphate."
"Farmers Choice Phosphate."
"Champion Phosphate."
"Normal Phosphate."
"Potato Fertilizer."
"Special Potato Manure."
"Thomas' Wheat & Corn Fertilizer."
"Victor Potash Manure."
"Top Dresser for Grass."
"Thomas' Scientific Tobacco Grower."
"Special Corn & Grain Fertilizer."
"Bulls Eye Fertilizer."
"Special Alkaline Fertilizer."
"Pilot Potash Manure."
"Square Deal Fertilizer."
"Alkaline Fertilizer."
"S. C. Phosphate."
"Pure Ground Bone."
"Special Mixture."

TRENTON BONE FERTILIZER COMPANY, TRENTON, N. J.

"Farmers High Grade Potato."
"Potato Manure."
"Keystone Potato."
"Corn Mixture."
"Special Corn."
"Trenton High Grade Potato."
"Trenton Special Potato."
"Stults Mixture."
"Grain Manure."
"Tomato & Truck."

FOR JOHN L. TREXLER, MERTZTOWN, PA.

"Trexler's Special High Grade Phosphate & Potash Mixture."

JACOB TRINLEY & SONS, LINFIELD, PA.

"Pure Raw Bone Meal."
"Pure Bone and Phosphate."

"Grain and Grass Grower."
"Ravene Phosphate for all Crops."
"Special Potato Manure."
"Trinley's Two-Eight-Five."
"Favorite Phosphate."

F. W. TUNNELL & COMPANY, INC., PHILADELPHIA, PA

"Empire Potato Manure."
"High Grade Truck & Potato Manure."
"No. 1 Special High Grade Potato Manure."
"Special High Grade Potato Manure."
"Sweet & White Potato Manure."
"Potato & Grain Manure."
"Trucker's High Grade Fish Guano."
"Royal Fish Guano."
"Complete Superphosphate."
"Royal Wheat Grower."
"Raw & Acidulated Animal Compound."
"Ammoniated Phosphate & Potash."
"Resieved Phosphate."
"Pure Ground Bone."
"Dissolved Rock."
"Pride of Jersey."
"2-8-10 Potato Manure."
"7 Per Cent. Guano."

TUSCARORA FERTILIZER CO., BALTIMORE, MD.

"Acid Phosphate."
"Phosphate & Potash."
"Alkaline.'
"Ammoniated Phosphate."
"Crop Grower."
"York State Special."
"Standard."
"Fruit & Potato."
"Big (4) Four."
"Animal Bone."
"German Kainit."

FOR THE J. E. TYGERT CO., PHILADELPHIA, PA. BY THE AMERICAN AGRICULTURAL CHEMICAL CO.

"Acid Phosphate."
"Soluble Phosphate & Potash."
"Electro Phosphate."
"Prolific Phosphate."
"Golden Harvest Phosphate."
"Popular Phosphate."
"Potato Fertilizer."
"Victor Crop Grower."

"Ammoniated Super Phosphate."
"Standard Fertilizer."
"Gold Edge Potato Guano."
"Old Reliable Phosphate."
"Potato Guano."
"Ten Per Cent. Grain Grower."
"Potato Special."
"Early Truck Guano."
"Special Potato & Tobacco Fertilizer."

UNION CHEMICAL WORKS, INC., NORTH WALES, PA.

"Raw Bone Meal."
"Bone Meal."
"Ideal Potato Manure (Planting Brand)."
"Ideal Potato Manure (Top Dressing Brand)."
"High Grade Vegetable Guano."
"Potato & Celery Special."
"Grangers' Favorite."
"Animal Bone with Potash."
"Farmers' Special."
"General Crop Grower."
"Superphosphate and Potash Uo. 2."
"Superphosphate and Potash No. 1."
"Superphosphate and Potash for Potatoes."
"Grain & Grass Grower."

THE UNITED STATES FERTILIZER CO., BALTIMORE, MD.

"Farm Bell 7 Per Cent. Trucker."
"Farm Bell Trucker's Ideal."
"Farm Bell Trucker's Favorite."
"Farm Bell Potato and Tobacco Guano."
"Farm Bell Fruit and Potato Guano."
"Farm Bell Animal Ammoniated."
"Farm Bell Potato Queen."
"Farm Bell Standard Guano."
"Farm Bell Potato Guano."
"Farm Bell Farmer's Choice."
"Farm Bell Meat and Potash Mixture."
"Farm Bell Harvest Moon."
"Farm Bell Wheat Oat Corn Special."
"Farm Bell Pennant Winner."
"Farm Bell Buckeye Guano."
"Farm Bell Crop Producer."
"Farm Bell Klimax Kompound."
"Farm Bell Grain Grower."
"Farm Bell Keystone Mixture."
"Farm Bell Fruit and Grain Grower."
"Farm Bell Phospho Potassa."
"Farm Bell Potash and Acid."
"Farm Bell Ten Five Mixture."
"Farm Bell Special Mixture."

"Farm Bell Alkaline Mixture."
"Farm Bell Phosphate and Potash."
"Farm Bell Six-Three Mixture."
"Farm Bell Acid Phosphate 16 Per. Cent."
"Farm Bell Acid Phosphate 14 Per Cent."
"Farm Bell Raw Bone."
"Nitrate of Soda."
"Sulphate of Potash."
"Muriate of Potash."
"German Kainit."

VIRGINIA-CAROLINA CHEMICAL COMPANY FOR RESALE BY RASIN-MONUMENTAL CO., BALTIMORE, MD.

"VCCCO'S Owl Brand Guano."
"VCCCO'S Fish Bone & Potash."
"VCCCO'S Standard Crop Grower."
"VCCCO'S Wheat & Clover."
"VCCCO'S National Ammoniated Guano."
VCCCO'S Special for Wheat & Grass."
"VCCCO'S High Grade Phosphate & Potash."
"VCCCO'S Star Truck Compound."
"VCCCO'S Special Phosphate & Potash."
"VCCCO'S Standard Phosphate & Potash."
"VCCCO'S Special Potash Mixture."
"VCCCO'S Peerless Phosphate & Potash."
"VCCCO'S Corn & Buckwheat Special."
"VCCCO'S Union Super Phosphate."
"VCCCO'S Guaranteed fourteen per cent Acid Phosphate."
"Pure Raw Bone."
"Muriate of Potash."
"Nitrate of Soda."
"Genuine German Kainit."

EMIL WAHL MANUFACTURING CO., PHILADELPHIA, PA.

"Emil Wahl's Warranted Pure Philadelphia Button Bone Meal."

JOS. C. WALKER & SONS CO., GAP, PA.

"Pride of Pequea 'High Grade.' "
"Pride of Pequea."

WARREN FERTILIZER COMPANY, WARREN, PA.

"Reliance High Grade Fertilizer."
"Potato & Truck Special."
"Soluble Phosphate & Potash."
"Soluble Phosphate."
"Nitrate of Soda."
"Muriate of Potash."

**FOR W. E. WHANN CO., PHILADELPHIA, PA. BY AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY.**

"South Carolina Phosphate."
"Whann's Alkaline Phosphate."
"Whann's Chester Valley Favorite Fertilizer."
"Whann's Chester Valley Economist Fertilizer."
"Whann's Chester Valley Special Ammoniated Super Phosphate."
"Whann's Chester Valley 15 Per Cent. Guano."
"Whann's Chester Valley Available Ammoniated Super Phosphate."
"Whann's Chester Valley No. 2 Ammoniated Super Phosphate."
"Whann's Chester Valley 10 Per Cent. Sweet Potato & Tomato Manure."
"Whann's Chester Valley Fish & Potash Fertilizer."
"Whann's Chester Valley Special Potato & Truck Fertilizer."
"Whann's Chester Valley 10 Per Cent. Potato Manure."
"Whann's Chester Valley Nitrate Mixture for Top Dressing."

**THE ROBERT A. WOOLDRIDGE COMPANY, BALTIMORE, MD.**

"Wooldridge's Florida Acid Phosphate."
"Woolridge's No. 1 Phosphate & Potash."
"Wooldridge's No. 2 Phosphate & Potash."
"Wooldridge's German Potash Mixture."
"Wooldridge's Ideal, Grain & Grass Producer."
"Wooldridge's Liberty Bell Potash Mixture."
"Wooldridge's Old Sledge Phosphate."
"Wooldridge's Farmer's Favorite Cereal Compound."
"Wooldridge's Champion Stag Phosphate."
"Wooldridge's Chieftain Phosphate."
"Wooldridge's Triumph Brand Phosphate."
"Wooldridge's Special Potato & Tobacco Fertilizer."
"Woolridge's Double Quick Phosphate."
"Wooldridge's Fernwood Grange Mixture."
"Wooldridge's High Grade Ammoniated Potash Fertilizer."
"Wooldridge's Pure Raw Bone."

**ROBERT A. WOOLDRIDGE, TRADING AS THE WOOLDRIDGE FERTILIZER CO., BALTIMORE, MD.**

" 'F. F. V.' Flesh & Fish Vegetator."
" 'Cyclone.' "
"Tiger Phosphate."
" 'Old Hickory' Phosphate."
"Wooldridge's 'Clover Leaf' Crop Grower."
"High-Grade 'Potato & Tomato Grower."
" 'Golden Crescent.' "
" 'Catorce' Royal Potato Grower."
" 'Omega Wright's Special Brand."
" 'Virginia Bell' Potash Mixture."
" 'Curacao Guano."

YORK CHEMICAL WORKS, YORK, PA.

"Dempwolf's Standard."
"Dempwolf's Plow Brand."
"Dempwolf's Standard Potash."
"Dempwolf's Prosperity."
"Dempwolf's Harvest Queen."
"Dempwolf's Half & Half."
"Dempwolf's Potato Manure."
"Dempwolf's Spring Special."
"Dempwolf's Potato & Truck Special."
"Dempwolf's Special Tobacco."
"Dempwolf's Early Trucker."
"Dempwolf's Ammoniated R B."
"Dempwolf's Raw Bone Meal."
"Dempwolf's Pure Ground Bone."
"Dempwolf's Dissolved Animal Bone."
"Dempwolf's Red Cross."
"Dempwolf's York Special."
"Dempwolf's Black Cross."
"Dempwolf's Phosphate & Potash."
"Dempwolf's Superphosphate."
"Dempwolf's Dissolved Phosphate."
"Dempwolf's Crop Grower."
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Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

BULLETIN No. 246

## Proceedings of the Thirty-Seventh Annual Meeting of the

# Pennsylvania State Board of Agriculture

HELD IN THE

Caucus Room of the House of Representatives, Capitol,
Harrisburg, Pa., January 28-30, 1914

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# MEMBERS

OF THE

# Pennsylvania State Board of Agriculture

FOR THE YEAR 1914

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## MEMBERS EX-OFFICIO

HON. JOHN K. TENER, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN ERLE SPARKS, President of the State College.
HON. A. W. POWELL, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

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## APPOINTED BY THE GOVERNOR

Gen. James A. Beaver, Bellefonte, Centre County, ............Term expires 1916
Mrs. Jean Kane Foulke, West Chester, Chester County, ........Term expires 1917

---

## APPOINTED BY THE PENNSYLVANIA STATE POULTRY SOCIETY

W. Theo. Wittman, ..........................Allentown,........................1917

---

## APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer, ..............................Lebanon, ........................1915

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## ELECTED BY COUNTY AGRICULTURAL SOCIETIES

| | | | Term expires |
|---|---|---|---|
| Adams, | A. I. Weidner, | Arendtsville, | 1915 |
| Allegheny, | A. J. Purdy, | Imperial, R. F. D. No. 1, | 1915 |
| Armstrong, | S. S. Blyholder, | Kelly Station, | 1917 |
| Beaver, | Walter C. Dunlap, | West Bridgewater, | 1917 |
| Bedford, | Wm. F. Biddle, | Everett, | 1915 |
| Berks, | H. G. McGowan, | Geiger's Mills, | 1916 |
| Blair, | W. Frank Beck, | Altoona, | 1917 |
| Bradford, | F. D. Kerrick, | Towanda, | 1916 |
| Bucks, | B. Frank Wambold, | Sellersville, | 1917 |
| Butler, | Wm. H. Milliron, | Euclid, | 1917 |
| Cambria, | L. J. Bearer, | Hastings, | 1916 |
| Cameron, | R. P. Heilman, | Emporium, | 1916 |

| | | | Term expires |
|---|---|---|---|
| Carbon, | Edward Lienhard, | Mauch Chunk, | 1917 |
| Centre, | John A. Woodward, | Howard, | 1915 |
| Chester, | M. E. Conard, | Westgrove, | 1915 |
| Clarion, | J. H. Wilson, | Clarion, | 1916 |
| Clearfield, | Harrison Straw, | Clearfield, | 1916 |
| Clinton, | Joel A. Herr, | Millhall, | 1917 |
| Columbia, | A. P. Young, | Millville, | 1916 |
| Crawford, | | | |
| Cumberland, | Abram Bosler, | Carlisle, | 1916 |
| Dauphin, | E. S. Keiper, | Middletown, | 1917 |
| Delaware, | Thos. H. Wittkorn, | Media, | 1917 |
| Elk, | John M. Wittman, | St. Mary's | 1916 |
| Erie, | John J. Rouse, | Wattsburg, | 1916 |
| Fayette, | John T. Smith, | Dunbar, | 1916 |
| Forest, | | | |
| Franklin, | J. P. Young, | Marion, | 1917 |
| Fulton, | Frank Rauck, | Hancock, Md., | 1916 |
| Greene, | C. E. Lantz, | Carmichaels, | 1916 |
| Huntingdon, | Geo. G. Hutchison, | Warrior's Mark, | 1915 |
| Indiana, | S. C. George, | West Lebanon, | 1916 |
| Jefferson, | Peter B. Cowan, | Brookville, | 1916 |
| Juniata, | Matthew Rodgers, | Mexico, | 1915 |
| Lackawanna, | Horace Seamans, | Factoryville, | 1916 |
| Lancaster, | J. Aldus Herr, | Lancaster, | 1917 |
| Lawrence, | Sylvester Shaffer, | New Castle, | 1916 |
| Lebanon, | H. C. Snavely, | Cleona, | 1916 |
| Lehigh, | P. S. Fenstermaker, | Allentown, | 1915 |
| Luzerne, | | | |
| Lycoming, | A. J. Kahler, | Hughesville, | 1915 |
| McKean, | E. A. Studholme, | Smethport, | 1916 |
| Mercer, | W. C. Black, | Mercer, | 1917 |
| Mifflin, | M. M. Naginey, | Milroy, | 1916 |
| Monroe, | F. S. Brong, | Saylorsburg, | 1916 |
| Montgomery, | John H. Schultz, | Norristown, | 1917 |
| Montour, | J. Miles Derr, | Milton, | 1916 |
| Northampton, | C. S. Messinger, | Tatamy, | 1915 |
| Northumberland, | I. A. Eschbach, | Milton, R. D., | 1916 |
| Perry, | Clark M. Bower, | Blain, | 1916 |
| Philadelphia, | David Rust, | Philadelphia, | 1916 |
| Pike, | B. F. Killam, | Paupack, | 1915 |
| Potter, | | | |
| Schuylkill, | John Shoener, | New Ringgold, | 1916 |
| Snyder, | | | |
| Somerset, | Robert W. Lohr, | Boswell, | 1917 |
| Sullivan, | E. R. Warburton, | Campbellsville, | 1915 |
| Susquehanna, | Frank A. Davies, | Montrose, | 1916 |
| Tioga, | C. H. DeWitt, | Mansfield, | 1917 |
| Union, | J. Newton Glover, | Vicksburg, | 1917 |
| Venango, | | | |
| Warren, | R. J. Weld, | Sugargrove, | 1917 |
| Washington, | Jas. M. Paxton, | Houston, | 1917 |
| Wayne, | W. E. Perham, | Varden, | 1917 |
| Westmoreland, | W. F. Holtzer, | Greensburg, | 1916 |
| Wyoming, | G. A. Benson, | Tunkhannock, | 1916 |
| York, | Geo. F. Barnes, | Rossville, | 1917 |

# OFFICERS

## PRESIDENT

| | |
|---|---|
| Hon. John K. Tener, | Harrisburg. |

## VICE PRESIDENTS

| | |
|---|---|
| Hon. J. H. Wilson, | Clarion. |
| B. F. Killam, | Paupack. |
| S. C. George, | West Lebanon. |

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|---|---|
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| M. M. Naginey, | Milroy |
| Hon. H. G. McGowan, | Geiger's Mills. |
| S. S. Blyholder, | Kelly Station. |
| Mrs. Jean K. Foulke, | West Chester. |
| W. F. Holtzer, | Greensburg. |
| John Shoener, | New Ringgold. |
| J. Newton Glover, | Vicksburg. |
| George F. Barnes, | Rossville. |
| Hon. N. B. Critchfield, Secretary, | Harrisburg. |
| R. J. Weld, Assistant Secretary, | Sugargrove. |

## ADVISORY COMMITTEE, CONSULTING SPECIALISTS AND STANDING COMMITTEES AS REPORTED BY THE EXECUTIVE COMMITTEE

### ADVISORY COMMITTEE

| | |
|---|---|
| Dr. W. Frank Beck, | Altoona. |
| Mrs. Jean Kane Foulke, | West Chester. |
| J. Newton Glover, | Vicksburg. |

### COMMITTEE ON RESOLUTIONS

| | |
|---|---|
| John Shoener, | New Ringgold. |
| G. A. Benson, | Tunkhannock. |
| Joel A. Herr, | Millhall. |
| F. S. Brong, | Saylorsburg. |
| B. Frank Wambold, | Sellersville. |

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| M. M. Naginey, | Milroy. |
| Hon. H. C. Snavely, | Cleona. |
| Hon. H. G. McGowan, | Geiger's Mills. |
| Hon. Robert W. Lohr, | Boswell. |

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| | | |
|---|---|---|
| Botanist, | Prof. F. D. Kern, | State College. |
| Pomologist, | Chester J. Tyson, | Floradale. |
| Chemist, | Dr. William Frear, | State College. |
| Vet. Surgeon, | Dr. C. J. Marshall, | Harrisburg. |
| Sanitarian, | Dr. S. G. Dixon, | Harrisburg. |
| Microscopist and Hygienist, | Prof. J. W. Kellogg, | Harrisburg. |
| Entomologist, | Prof. H. A. Surface, | Harrisburg. |
| Ornithologist, | Dr. Joseph Kalbfus, | Harrisburg. |
| Meteorologist, | Prof. W. G. Owens, | Lewisburg. |
| Mineralogist, | Dr. Isaac A. Harvey, | Lock Haven. |
| Apiarist, | H. C. Klinger, | Liverpool. |
| Economic Geologist, | Baird Halberstadt, | Pottstown. |
| Agricultural Geologist, | W. H. Stout, | Pinegrove. |
| Forests and Forestry, | Miss Mira L. Dock, | Fayetteville. |
| Feeding Stuffs, | G. G. Hutchison, | Warrior's Mark |
| Soils and Crops, | Prof. Franklin Menges, | York. |
| Insecticides, | J. D. Herr, | Lancaster. |

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### FERTILIZERS

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James M. Paxton, ..................................................Houston.

### LIVESTOCK

W. C. Black, ........................................................Mercer.

### POULTRY

W. Theo. Wittman, ................................................Allentown.

# Proceedings of the Thirty-Seventh Annual Meeting of the State Board of Agriculture, Held in the Caucus Room of the House of Representatives, Capitol Building, Harrisburg, Pa., January 28-30, 1914.

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January 28, 1914, 9.30 A. M.

SECRETARY CRITCHFIELD: Gentlemen of the Board: The program announces that the Governor will be in attendance this morning and open the first session. The Governor is very busy just now and cannot come in for a little while, and since we have a good corps of Vice-Presidents, we will expect them to arrange among themselves for calling the Board to order and proceed with the business. The Governor will be in a little later.

Vice-President J. Aldus Herr then took the Chair and called the meeting to order.

The CHAIRMAN: The meeting will come to order. Gentlemen, in calling our meeting to order, it is my first opportunity of appearing before you as Chairman of a meeting like this and I hope you will give us the support necessary to make the meeting successful. We have come here for a purpose, and we should, as individuals, try to accomplish some good for our constituents. If we were not sent here for a purpose and did not expect to do something, we had better stay at our homes. But I do not care to take up any time and will proceed with the general program as outlined. The Secretary will call the roll, and as each name is called, the gentlemen will respond.

The roll of members was then called by Assistant Secretary Weld, and at this and subsequent roll calls the following members were found to be present:

Hon. John K. Tener, Hon. Henry Houck, Dr. N. C. Schaeffer, Hon. A. W. Powell, Hon. N. B. Critchfield, Mrs. Jean Kane Foulke, W. Theo. Wittman, A. I. Weidner, A. J. Purdy, S. S. Blyholder, H. G. McGowan, Dr. W. F. Beck, B. Frank Wambold, L. J. Bearer, R. P. Heilman, Edward Lienhard, John A. Woodward, M. E. Conard, J. H. Wilson, Harrison Straw, Joel A. Herr, A. P. Young, John M. Wittman, John J. Rouse, John P. Smith, J. P. Young, Frank Rauck, C. E. Lantz, Geo. G. Hutchison, S. C. George, Peter B. Cowan, Matthew Rodgers, Horace Seamans, J. Aldus Herr, Sylvester Shaffer, P. S. Fenstermaker, A. J. Kahler, E. A. Studholme, M. M. Naginey, F. S. Brong, John H. Schultz, J. Miles Derr, C. S. Messinger, I. A. Eschbach, Clark M. Bower, B. F. Killam, John Shoener, Robert W. Lohr, E. R. Warburton, Calvin H. DeWitt, J. Newton Glover, R. J. Weld, James M. Paxton, W. F. Holtzer, G. A. Benson and Geo. F. Barnes.

The CHAIRMAN: You have heard the roll called, gentlemen, and the Chair will now appoint a Committee on Credentials, after which the Secretary will read the minutes of the previous meeting. The Committee on Credentials will consist of F. S. Brong, H. G. McGowan, P. S. Fenstermaker, Matthew Rodgers and Joel A. Herr.

MR. HERR: I have credentials to submit; therefore I don't want to act on my own credentials. Please appoint some one else in my place.

The CHAIRMAN: Instead of Mr. Herr I will appoint Mr. Sylvester Shaffer. Shall we proceed with the report of the special committees or wait till the Secretary comes in with the minutes?

SECRETARY CRITCHFIELD: I have just been notified that the Governor will be able to come down now and I move you, sir, that you appoint a committee of two to go up and escort the Governor to the place of meeting.

The CHAIRMAN: I will appoint Mr. Hutchison and Mr. De Witt. The Committee on Credentials had better take up that end of the work and look after those papers. The Chairman of that Committee is Mr. Brong. The Secretary has returned and we will now have the minutes of the previous meeting.

Assistant Secretary Weld then read the minutes of the Spring Meeting of the State Board of Agriculture, held at Washington, Pa., May, 1913.

The CHAIRMAN: You have heard the reading of the minutes of the meeting. What action is to be taken?

On motion of Mr. Perham, the minutes of the Spring Meeting were adopted as read.

The CHAIRMAN: Next, are reports of Specialists: First, is the report of the Pomologist, Chester J. Tyson, of Floradale. Is Mr. Tyson present? The gentleman is not present. I see Dr. William Frear, the Chemist, is present and we will have his report.

Dr. Frear made his report as follows:

## NOTES ON THE USE OF RAW ROCK PHOSPHATE

By DR. WILLIAM FREAR, *State College, Pa.*

Mr. President and Members of the Board: I desire to select, for my subject today, "Notes on the Use of Raw Rock Phosphate."

The past decade has witnessed a slowly growing, but widely extended interest in fine ground rock phosphate, or floats as a phosphatic fertilizer. Judging by the frequent inquiries coming to my desk, the growth of interest is steadily increasing. This interest is reflected by frequent reference to the subject in the public press. The matter has received much attention and extensive experiment in Europe; as well as in America. In view of the volume of inquiries upon this topic, I have thought it a suitable theme for a brief discussion on this occasion.

The desire to keep down the cost of fertilizer applications, so far as may be without sacrifice of net profit, is natural. With rock floats containing 65 per cent. bone phosphate of lime, equivalent to 30.43 per cent. of phosphoric acid ($P_2O_5$), or 608.6 pounds per ton, purchasable at $8.00 to $10.00 per ton, f.o.b. point of delivery in Pennsylvania; that is, at 1.3 to 1.7 per cent. per pound of phosphoric acid; and dissolved rock phosphate containing 14 per cent. or 280 pounds per ton, purchasable, under like conditions, at $9.00 to $11.00 per ton, or 3.25 to 3.94 per pound of available phosphoric acid, the temptation to give preference to the former material is very great.

Owing, however, to its comparative insolubility, raw rock phosphate has very marked limits to its usefulness. These limitations relate to the soil, the crops upon which raw phosphate may be used, and also to the materials suitable for application with it.

Soil Limitations:—The Association of German Agricultural Experiment Stations, at its meeting of September 14, 1907, passed a formal resolution upon the subject, declaring that the numerous experiments upon the use of phosphorites, or raw rock phosphates, having given useful results only upon acid soils, the Association was constrained to withhold commendation for their use upon other soils.

The most pronounced American advocate upon the use of raw rock phosphates in general fertilizer practice is Prof. C. G. Hopkins of Illinois. Even he does not regard them as immediately productive, except when applied to soils rich in organic matter, either already present or applied with the raw phosphate in the form of green manures or of heavy dressings of stable manure, and hopes for a cumulative effect in later years for pay back principal and compound interest of the fertilizer investment. In his interesting work on "Soil Fertility and Permanent Agriculture," he cites the long continued experiments of the Pennsylvania, Ohio, Maryland, Massachusetts, Rhode Island Experiment Stations, and prefers that their results for his guidance to those of European experiments, even though the latter far surpass in number the experiments made on this side of the Atlantic. The American experiments upon which Prof. Hopkins relies have the values that belong to long continued field experiments, whereas, the European tests have more frequently been of less duration and, in the greater number of cases, been pot or box experiments in which the soils have been out of the usual relations to the sub-soil, although the soil moisture has been kept more uniform than that of field soils. Nevertheless, we must recognize the fact that some of the European experiments have been made in the field and have continued for years.

It is worth while to consider certain facts concerning the soils upon which the above mentioned American experiments were made. Those of the Ohio and Maryland Stations showed a generous response to liming in experiments begun at about the time the phosphate experiments were started. The Rhode Island Station soil is notoriously acid, but part of the plants used were given very light dressings of lime. The land used in the Massachusetts experiment was old meadow land. The Pennsylvania experiments only have been conducted on limestone land and, at the time when the results of this set of experiments were published, it was believed that the soil was well supplied with carbonate of lime. We now know, however, that most of our Station land is not alkaline, and that it tends to become so acid as to require liming for the maintenance of the best stands of grass and clover. In other words, these experiments cited by Dr. Hopkins were all made upon soils that were either somewhat acid, or, at the best, probably not far from neutral.

It is the general experience that, on distinctly acid soils—the raw phosphate commonly gives as good, if not better yields than the soluble phosphates, which may increase the acidity and its injuries to such plants as are sensitive to excess acid.

Crow Limitations:—The experience gathered from the various experiments—especially those of Wheeler of Rhode Island and of Kossonit and Prianishnikoo in Russia—indicates that some species of plants are far better able than others to use the phosphoric acid of raw phosphates. That is, there are some crops which will give a more immediate return than others from such fertilizer. The observations did not always include the same plants, and were made, some upon highly acid soils, others upon less acid or neutral soils; hence, conclusions have differed according to the conditions.

From the experience of fifteen investigators, we may conclude that: Buckwheat and mustard are able to use phosphoric acid and rock-floats even on non-acid soils. Of the legumes, likewise, crimson clover, aduzki beans and soy beans utilize it fairly well; peas, in moderate amount; red clover, cow peas and vetch, imperfectly. The cereals in general, are less able to use it than the legumes, but oats and corn use it more than most of the cereals; winter rye, moderately; in less degree, golden millet, Japanese millet (on acid soil), barley (on soil not too acid); wheat, very little. Among the root crops, potatoes (on acid soil) and mangels (on soil not very acid) use it in moderate amounts; but the turnip, table beet, carrot and ruta baga little or not at all. As to other crops, it is fairly effective with hemp and summer squash; somewhat so with rape and cabbage; very little, if at all, with the Hubbard and crooked-necked squashes, tomato, lettuce, spinach, and especially with tobacco, asparagus and flax. When the purpose of using raw rock phosphate is to increase the available phosphoric acid of the soil, the use of buckwheat, mustard or lupine as a green manuring crop to be grown with the raw phosphate, would seem to promise the quickest aid. In the ordinary four-course rotation, corn and oats, rather than potatoes, wheat, barley, and clover, would afford the best point of application. Crops of long period of growth, rather than those of quick growth, should be used with the floats.

Adaptation of Associated Materials:—In the recent literature, the highest interest centers upon the subject of the best material with which to mix the raw phosphate at the time of its application. The acid soils upon which its phosphoric acid becomes most available are little, if at all, neutralized by the phosphate of lime it contains; although the small amounts of carbonate of lime commonly present in the rock phosphate, may perform a little service of this kind. From many crops, the best returns upon acid soils are not to be gained without liming. What influence does liming have upon the availability of the phosphoric acid in raw phosphate? is the next question: The experimental evidence is somewhat conflicting, but, in general, seems to warrant these conclusions:

When lime, in large excess acts upon insoluble iron and aluminum phosphates, the tendency is to increase the solubility of the phosphate in weak organic acids, providing the latter are used in quantity beyond that needed to neutralize the lime. The results obtained by the writer in experiments upon the effect of lime and magnesia upon the state of solubility of the phosphoric acid in various soils, may probably be thus explained. On the other hand, the experiments of Prianishnikoo, Nagarka, Schulze, Suzuki, Westheuser and Zielstorff, Ostryzauer, Rindell and Shuloo, all exhibited a depression, often very serious, of the availability to plants of the phosphoric acid in raw phosphates upon the addition of lime; although Wheeler and Schrieber did not observe this in all cases. In the present state of our knowledge, it may be safest to adopt the rule, when raw phosphates are to be used on very acid soils, of adding only enough lime to reduce the degree of acidity, though not entirely to neutralize it, especially when the crop is to be used is particularly sensitive to excessive acidity. For in highly acid soils, no matter how rich in available phosphoric acid they may be, such crops will not thrive.

On soils that are neutral or but slightly acid, and in growing crops that are not especially acid-sensitive, the admixture of sulphate of ammonia with the raw phosphate has been found helpful in increasing the availability of the phosphoric acid. Nitrate of soda has the opposite effect, and, for this reason, has been used to replace a part of the ammonium sulphate when the crop was acid-sensitive. The nitrogenous fertilizer must be intimately mixed with the rock phosphate to have much effect. Potash salts, alter physiologically acid like ammonium sulphate, have not been found efficient in their action upon raw phosphates.

Probably the most interesting result of mixing other materials with raw phosphate upon the availability of the latter, is that obtained by the Ohio Station with a mixture of manure, stable or yard, with floats, in which it was found that the availability of the phosphoric acid in the floats was so improved that the crop increase gave a very handsome return on the phosphate cost. The fact is thoroughly established for the soil in question by the continuance of the test through a number of rotations; but the reasons for the result are not so thoroughly determined as to enable us to adopt it unhesitatingly as a guide to general farm practice. Various theories have been advanced to account for the result:

(a) That the raw phosphate prevented loss of nitrogen from the manure decaying in the yard of stable, and thus indirectly helped the crops on this soil, somewhat deficient in nitrogen. But the raw phosphate has no qualities that would lead us to expect it to prevent nitrogen less during manure fermentation.

(b) That the manure fermentation itself makes soluble a portion of phosphoric acid in the raw phosphate, and thus the mixture of manure and phosphate is made directly to contribute soluble phosphoric acid to the soil. Years ago, however, Lupton tried without success to make Florida soft phosphate more available by rotting cottonseed meal intimately-mixed with the phosphate. In recent years, McDowell at the Pennsylvania Station, the chemist of the Ohio Station and Tottenham and Hoffman of the Wisconsin Station exposed Tennessee Floats to the action of rotting manure under the normal conditions of heap fermentation and found no increased solubility of the phosphoric acid either in water or in the weak acids usually employed to measure it. Results in general accord with those obtained by Holdefleiss, Pfeiffer and Theirmaun and Krober in composting raw phosphate with various organic materials. Truog at the Wisconsin Station recently obtained similar results, using cow manure and June grass as the organic substance with which the phosphate was mixed in parallel experiments.

(c) That the carbon dioxid developed by the manure as it ferments in the soil, effects an increase in the amounts of phosphoric acid over that usually dissolved by the soil from the raw phosphate; and also, that the same gas excluded by the plant roots may supplement the work performed by the carbon dioxid from the fermenting manure.

That fermenting manure upon addition to the soil does for a time decidedly increase the carbon dioxid in the soil air has repeatedly been shown; also that plant roots excrete their gas, the more abundantly as the plant is the more vigorous.in growth; also that water containing carbon dioxid in solution, can somewhat more largely than pure water, dissolve the phosphoric acid of raw prohphates. If then, a crop increases gradually in vigor because of its slight advantage in phosphoric acid supply early in growth, it might presently excrete relatively more dioxid and the more richly supply itself with this food in the later stages of its development. That the soil shows practically no more phosphoric acid soluble in water or in weak acids, with than without the raw phosphate, may be explained by the assumption that the extra amount dissolved during plant growth is immediately consumed by the plant.

There is much that lends acceptibility to this explanation. Unfortunately, Pfeiffer and Blanck, working upon a soil that received no manure, but rock phosphate and soluble phosphate added to different soil portions cropped with oats and brans respectively, repeatedly treated the soil one of two sets of the cultures with large excesses of carbon dioxid. The gas did not increase the assimilation of the raw phosphates.

(d) Hopkins suggestions that the nitrates formed from the manure may account for the solution of the rock phosphates. Vivien has shown that manure composited with raw phosphate does form a small quantity of nitrates. But the manure is alkaline and contains other bases that can unite with the nitric acid more readily than lime from calcium phosphates. Only in case the formation of nitric acid occurred in a highly acid soil, would an attack by it upon the rock phosphate be repeated.

(e) Stoklass, Koch and Kröber, and Sackett, Patten and Brown, have shown that various soil bacteria, yeast and molds indirectly promote the solution of phosphoric acid from the rock phosphate. But the chief effect in the action is, again, carbonic dioxid. The weak acids, acetic, butyric and lactic formed by some of the bacteria do not attack calcium phosphate, so long as there is any more readily attacked compound present, such as the carbonates of lime and magnesia.

Before dropping consideration of the Ohio experiments, we must not in noting the large return gained from the combination of manure and raw phosphate, lose sight of the fact that manure and acid phosphate, supplying an equal amount of phosphoric acid, gave somewhat the larger net cash returns. Unless a larger application of the rock phosphate would give relatively larger crops, which is not established, true economy would continue in practice the method now giving the larger net profit per acre.

It is worthy of note that Wheeler, in certain experiments at the Rhode Island Station, upon soils deficient in phosphoric acid, used raw rock phosphate mixed with manure, and failed to obtain results parallel with those shown in the Ohio Station's reports.

From all of these data, we are compelled to the conclusion that the facts obtained by trial of the raw phosphates under various conditions, do not warrant us in expecting from their use, a distinct immediate advantage, that is, one that will occur during the first and the next succeeding years, except where the soil is acid in condition, or possibly where it is unusually rich in iron and aluminum oxids; and, in that upon other lands, and particularly for crops of a short period of growth, it will be wisest to continue the use of acid phosphates.

(At this point, Governor Tener entered the room).

MR. HUTCHISON: Mr. Chairman, the Governor of the Commonwealth, Hon. John K. Tener. (Applause).

The CHAIRMAN: I will now turn the meeting over to Governor Tener.

Governor Tener then took the Chair and addressed the Board as follows:

## REMARKS OF GOVERNOR TENER

Mr. Chairman and Gentlemen: I am very glad to co-operate with the Secretary of Agriculture, Mr. Critchfield, in the arrangement of this meeting and to welcome you gentlemen here this morning. Also to suggest to the Secretary that he enlist the services of the heads of the several State Departments, that they might attend and address you on the work, the efforts and ramifications of their respective departments, all of which dovetail into the proper management of the affairs of this Commonwealth, because these department heads and their employes are simply servants of the State, and through them its business is transacted. Somebody must be Governor and somebody must be at the head of each of these departments, and it is assumed that we are attending to our work. If we were not here, someone else would be; so that the charge widely misses the mark when the assertion is made that the position of a State officer or employe is a sinecure, that we put in our time drawing our salaries and doing no work. To make at random such a charge against those who are here in office and who are conscientiously and efficiently performing their duties, is equivalent to losing your faith in humanity, and to lose faith in humanity is to lose faith in yourselves as well. It is not to be supposed that you could do any better than they are doing, or that you would have a higher sense of the duty and responsibilities of the office than the present officials and employes of the Commonwealth.

I do not propose to make any extended remarks or go into details concerning the management of any of our departments, and certainly not of our Agricultural Department, because the Secretary and other officers of that department are here, and besides, I am sure that each of you gentlemen know more about agriculture than I do.

The respective chiefs of the departments of the State government will address you at this meeting if time permits, and I am sure you will find a great fund of interesting information in what they will tell you.

During the past three years very helpful and advanced and really progressive legislation has been passed by the General Assemblies of 1911 and 1913. New and much needed Bureaus have been created; laws of real material advantage to every citizen of this Commonwealth have been passed. Our Public Utility Law is one, and its provisions and administrations affect in a beneficial way every man here, because every one of you are users of such public utilities as transportation, power, light, heat, water and the real necessities of life. Under that law and through the administration of it by the Public Service Commission, every citizen is guaranteed that the utility companies of this State shall charge him only fair and reasonable rates for what they give, and those rates shall not discriminate in favor of anyone, and the whole basis and foundation of that Act is fairness and reasonableness. That will be the policy of the Commission and that is what you will get. Anyone who seeks more than simple justice to himself is not an honorable man.

The creation of our Department of Labor and Industry is another very important step in advance, and through that department, health and life in and about our mills and factories are safeguarded. Ventilation, light and sanitation are especially looked after by that department, and its whole purpose is to maintain a protecting supervision over working conditions in such places. And, so I might run through all the departments of the State here. You will have a representative from the Treasury Department, the Auditor General, the Secretary of the Commonwealth, the Commisioner of Banking, Dr. Dixon of the Health Department, Mr. Bigelow or one of his representatives from the Highway Department, and I think from every important department of the Commonwealth there will be a representative here to address you.

I do not know that there is any special message I would like to leave with you, unless I might touch again on that subject which has been brought into great prominence recently, and which, like the poor, is ever with us,—the subject of good roads. At the last election, manifestly the people of the State did not think that the plan proposed, namely, the issuance of bonds in the amount of $50,000.00, was the proper method of raising money for this work. If there be a better plan to raise money for road construction, let us have it, but first let us make sure, until the Sproul Act is repealed—and I hope it never will be—that provision is made for the proper maintenance, at least, of the entire 8,800 miles of highway under that Act. If that mileage of road is to be cared for hereafter by the State, let us see to it that the money is provided, so that our highways will be properly maintained, and that those highways embraced within the Sproul Act will be good ones at least ten months in the year. I believe you will agree with me that these roads are in better condition than they were last year, and in fact, better than they ever were before, but they cannot be kept in good condition and certainly not permanently improved unless money is provided. Therefore, let us, at all hazards, first provide enough money for their proper upkeep and then take up the construction of new ones; and, if the ordinary revenues of the State will permit it, all well and good; or, if we believe that direct taxation is the better way to raise this money, let that be the policy. I am still of the opinion that the way proposed, that is, through a bond issue, is the proper one. By this method, no tax would be levied to meet the principal of the bonds or interest thereon; no farmer's tax would be increased one penny; that every inch of property abutting on these roads or adjacent to them would enhance immensely in value, and that those who come after us may help to bear the burden through the same means as we today secure the resources for the runing of the government of this State, namely, corporation taxes, licenses and fees.

Pennsylvania should be proud, and we all *do* take pride in the fact that for State purposes today, not one penny of taxation is levied against real or personal property. And so, if we could have these great improvements without the levy of such a tax, it seems to me it should be satisfactory all round.

I am now ready to proceed with the business of the day, and while I cannot spend much time at this meeting, I am so interested in knowing what you do and how you do it, that I will spend every minute possible with you.

MR. FENSTERMAKER: Mr. Chairman, the Committee on Credentials find two sets of representatives from Mercer county. We would like to have their representatives, John E. Vernon and W. C. Black, appear before us now.

SECRETARY CRITCHFIELD: A letter from Mr. Black says that he will not be able to be present at this session on account of illness.

MR. J. ALUDS HERR: Is the other gentleman present? I do not hear any response, Mr. Fenstermaker.

The CHAIRMAN: (Governor Tener). I am advised that Dr. Frear was advanced on the program due to the fact that Mr. Tyson was not in the room to take his proper turn. I now have the very great pleasure of presenting Mr. Tyson, for his report.

MR. TYSON: I have been suffering with a pretty bad cold for a few days and am not sure how I will get along with this, but I will do the best I can.

Mr. Tyson then presented the following report:

## REPORT OF POMOLOGIST, 1914

By CHESTER J. TYSON

Your Pomologist does not understand it to be his duty to make a detailed crop survey of the State, electing, rather, to bring out just a few points that it may pay each member of the Board to take with him.

We may just note, in passing, that Pennsylvania had not over 50 per cent. as many apples as in 1912, which means a light crop. The best crops were found in Adams, Franklin, York, Lancaster and Perry counties, with a fair set of fruit all the way up the Susquehanna valleys, especially on the higher elevations. Both slopes of the Alleghenies and most of the State west, had practically a crop failure. Prices at picking time ruled around $3.00 a barrel at shipping point in most sections of the State, and have improved somewhat since that time. Retail prices were, of course, proportionately higher. These are high prices and can hardly be expected to continue year after year. In fact, it may be many years before they are again reached.

This brings up the question so often heard these days, "Are too many apple trees being planted?" Not too many for the nurseryman who has trees to sell; but much the safest advice to the grower is to go slowly. I would especially caution the man just starting the planting of an orchard to make very sure of his ground, both as to finances to carry him over all times, and in respect to economy of production and convenience of markets.

When apples are selling at $3.00 per barrel, the cost of production does not bother us much; but when they get down to $1.50, and they may go lower, we must watch every corner of expense. A few cents either way on our expense account may mean profit or loss, and the profits are often eaten up by freight and hauling if the market is too far away.

I have two good friends who have settled this question beyond all peradventure. One of them has taken all the planting statistics he can secure and has worked out the number of bushels the country will be producing by 1915 and by 1920, and the result sounds rather discouraging to the man who has already found difficulty in selling his crops at a profitable rate.

The other man has visited the orchards of the Far West and has lived in Missouri, and is thoroughly familiar with the whole Middle West from Arkansas to Michigan. He says that the trees of the Far West are showing a decided tendency to be short lived, and that thousands upon thousands of trees in the Ozark region are already in a dying condition. He figures that the East must help to supply the Middle West, and he is sure that the low point of apple prices has been reached for many years to come. So there you are; you may take your choice. "Do I have an opinion of my own?" Surely, yes, but so had these gentlemen, and I cannot quite agree with either of them, for it seems to me that the man who has settled it by arithmetic is as far from the truth as the man who has taken his personal observation as the guide. So there you are again.

Here is my opinion for what it may be worth. In the first place, the Far West will never put the careful Pennsylvania grower out of business. The actual cost of production, plus the freight on Western fruit, will figure a handsome price for the Eastern grower. And this you may bear in mind. The markets of today will pay full as much per bushel for well grown Eastern fruit as for the Far Western when the grower's brand is known and the honesty of his pack is proven, and will use immensely larger quantities of the Eastern apples.

In the second place, we must remember that the Middle West is a great Ben Davis country;. and while a great many good varieties are grown there, still a very great majority of the trees in this vast area are Ben Davis, Ganos, Missouri Pippins and others of low grade. To be sure, a great country-wide crop of Ben Davis means a lot of very cheap fruit. On the other hand, such condition always increases the difference between the prices of low grades and high quality fruits. I am pretty well convinced that if we are in business in the right way, and have been careful as to varieties, we need not greatly fear the Ben Davis competition of the Middle West.

We have disposed of two of the natural divisions of apple growing in the United States. How about our own section, the vast Winesap, York Imperial, Baldwin, Spy, Greening section from the Carolinas to Canada and Nova Scotia? In my opinion, the really serious problem lies at your own door. Here and there over the whole area growers have been planting at a tremendous rate in the past ten years. In New York a majority of Baldwins have been planted, and in the Virginias perhaps more Yorks than any other. Neither of these varieties bear much under ordinary conditions before they are ten to twelve years old. This means that the next five to ten years will probably see the present number of trees in full bearing nearly doubled. I have figured entirely without the millions of trees planted in large "unit plan" or other similar scheme orchards, which I do not think need be considered at all.

Looking this condition calmly in the face, the conclusion cannot be evaded. It is hardly possible that the average prices for the next ten years can equal the average of the ten years past. Moreover, we must be prepared for a year after awhile when the orchards of our own section is in full blast and the Middle West has filled the South with its Bens, and has nearly enough better kinds for its own use, that we will begin to wonder what in the world is to become of all these apples, and the prices will go down, down, down. It is ever possible that several such years may come in procession, in which case some growers will become discouraged and many trees will be neglected and die.

It looks pretty black, does it not? Fortunately, there is another and a brighter side to the matter. There are a few well-known facts that help the situation a lot. Every dime dropped in the retail selling price of apples means increased consumption, thousands of barrels in the aggregate. A drop of fifty cents per barrel would probably almost double consumption. This means that before the price of good apples has gone down to an actual losing point, this great country of ours will be consuming tremendous quantities of fruit, and in that way the situation will to some extent correct itself.

Today, as never before, consumers, wholesale dealers and growers, both associated and independent, are aroused and are working to decrease the "cost of distribution," the difference between the wholesale price to the grower and the retail price to the consumer, the one greatest enemy to liberal consumption. In this regard, improved conditions are sure to come, and they will help in handling the large crops in the future.

Here is another cheering fact. In every market we find some fruit, a small percentage of the whole, selling at fifty cents to a dollar per barrel higher than the average market price. These are apples in the growing of which no detail has been neglected. They have been honestly graded and packed and probably bear the grower's name and address. It is entirely possible for anyone to grow and market fruit of this class, and yet hardly one out of ten will ever do it. Do you see the lesson?

In my opinion the great difference between the selling price of this strictly first-class fruit and that of the average grade will always exist, and it may even increase, and it is my firm belief that the time will never come when really high-class, well-packed fruit will need to sell at a loss.

I have gone somewhat at length into the discussion of this subject so as to make plain and strong the answer which I shall repeat and summarize as follows: Millions of apple trees have been planted throughout the country; years of low prices are absolutely sure to come; good fruit will always sell at a premium over ordinary fruit, and really good, honestly packed apples never need sell at a loss. Read that last clause again; it contains the kernel of the whole matter and every word in it has a meaning.

Good fruit will always sell at a premium over ordinary fruit. Grow the very best fruit that can be grown and secure this premium. Make it a habit and you will find that it is also becoming a habit with the man who handles your fruit to pay you a premium for it. Every day your position becomes better assured and the danger of loss in time of depressed markets becomes more and more remote.

Then you must bear in mind that honest packing is another essential. Pack honestly from principle, because it is right, not merely from policy, because you think it may pay. Be absolutely honest in everything you do; make it a habit of your life and the result will be that life will be worth living.

In these times of low prices that are sure to come we must be business men as well as apple growers, prepared at every turn to meet the demands of the market and ready at all times to stand for our own ground.

***Study the Markets:*** If you have much fruit to sell it is important to know the markets to which it will go. Study their requirements and ship your produce accordingly. Most of you know from hearsay, if not from experience, that white eggs sell best in New York and brown ones in Philadelphia. It is just as true that York Imperial apples sell better in New York than Baldwins, but the reverse is true in Philadelphia and Pittsburgh. Grimes Golden and Smokehouse do not sell well in New York, but are in demand in Philadelphia, Baltimore and Washington, D. C. Greenings do not sell at their best south of Mason and Dixon's line. You see what I mean.

Study the markets. Keep track of prices, so you may know what your fruit is worth and can talk intelligently to prospective buyers. Take a good trade paper or two. Ask the dealers to send you quotations. Do not take the best quotation you can find. Average the lot. Visit the markets and compare prices actually paid with the prices quoted. You will find a great mass of fruit selling below quotations, while here and there you will see an unusually fine lot, well graded and neatly packed, and probably bearing the grower's brand, selling at a considerable promium. Are you contributing to the great mass or these occasional fine lots? Here is food for thought.

*Get acquainted with your trade:* Pick a very few good dealers and stick to them until you know them and they know you and your fruit. They can then offer your fruit with confidence to their best trades, and draw a premium for it.

*Establish standards and stick to them:* Do not put your fruit up one way one day and a different way the next, and keep your trade turning somersaults to keep track of the changes. The result will be that the trade will not bother to keep track but will buy from someone who has established quality and grades.

*Let your light shine:* There can be no virtue in over-modesty. Let the world know what you are prepared to do for its comfort. Some well organized advertising campaigns for the selling of fruit have been carried on, and have worked very well. Let every package of your fruit bear your name and address, and continually proclaim your business and the quality of your wares.

When you have found your man, stick to him. You may sell direct for cash; you may allow him to sell on commission, or you may make any other arrangements you choose, but stick to your man, and if you do your part you will find him able to do better and better for you each year.

Perhaps you cater to a retail store trade. This is very desirable business if you are prepared to handle it. To work out best you must have storage facilities to suit your trade. A great many stores with a good apple trade are looking for just such an arrangement. Get these men to visit your farm from time to time. Let them see the fruit growing. Show them how you grade and pick. Give them honest goods and you can tie them to you against any reasonable competition.

I have long been interested in a third method of selling direct from the grower to the consumer. I am sure it is worth a careful study. The present cost of distribution is too high, and this may be done one way to reduce it. I find there are a great many people in the cities just now who are anxious to try this plan, and most of them have in mind that they can buy direct at a great saving to themselves, which of course does not help the grower very much.

Be all this as it may, I am well and thoroughly convinced that the time will never come that we shall wish to do without the wholesale handlers of our fruits. The best of them have establishments in the city, open the year round. They have regular customers whom they supply throughout the year at prices we could not hope to secure with our fluctuating crops, an abundance one year and perhaps none the next. These men are organized and are fighting many of our battles, because they are also their own battles. Through them transportation facilities have ben much improved, refrigeration has been far developed, and right now the International Apple Shippers' Association is waging a telling war for increased consumption of apples —the one great hope for the thousands upon thousands of newly planted apple trees in the East.

You will probably say I have neglected my duty as Pomologist if I close this report without any mention of apple varieties. It is not my intention at this time to recommend a list for your planting. But here is a point that is worth taking home to every county in the State. Beware of new varieties with high sounding names and beautifully colored pictures in the nursery catalog. With a very few exceptions, the old well tried varieties are best. If you care to experiment, do it with a few trees. You may save yourselves many dollars and some sore disappointments.

The CHAIRMAN: It is always very pleasant and very illuminating as well to listen to one who knows what he is talking about. The stamp of success as a fruit grower is on Mr. Tyson, and I am sure that every one of you were as much interested by his report as myself. I understand now that the Committee on Credentials is ready to report, and we will be glad to have that report at this time.

The Committee on Credentials then presented the following report:

## REPORT OF THE COMMITTEE ON CREDENTIALS

The following credentials of members were presented and found correct, and they were elected to membership:

| County | Name | Post Office |
|---|---|---|
| Washington, | Jas. M. Paxton, | Houston |
| Montgomery, | John H. Schultz, | Norristown |
| Somerset, | Robert W. Lohr, | Boswell |
| Clinton, | Joel A. Herr, | Mill Hall |
| Dauphin, | E. S. Keiper, | Middletown |
| Delaware, | Thos. H. Wittkorn, | Media |
| Tioga, | Calvin H. DeWitt, | Mansfield |
| Blair, | W. Frank Beck, | Altoona |
| Union, | J. Newton Glover, | Vicksburg |
| Bucks, | B. Frank Wambold, | Sellersville |
| Franklin, | J. P. Young, | Marion |
| Beaver, | Walter C. Dunlap, | West Bridewater |
| Warren, | R. J. Weld, | Sugargrove |
| Lancaster, | J. Aldus Herr, | Lancaster |
| York, | Geo. F. Barnes, | Rossville |
| Armstrong, | S. S. Blyholder, | Kelly Station |
| Mercer, | Wm. C. Black, | Mercer |
| Wayne, | W. E. Perham, | Varden |

We also recommend the following persons to be received as delegates:

E. Shuey, Clark G. Long, E. S. Risser, E. A. Weimer, F. R. Fertig, L. I. Bucher, S. P. Heilman, appointed by Lebanon County Agricultural Association.

Also the following gentlemen:

B. F. Kahler, Hughesville, Wm. Ball, Hughesville, Ed. Frantz, Hughesville, Walter Clark, Hughesville, Pa., K. W. Robinson, Port Royal, J. K. McLaughlin, Port Royal, A. S. Adams, Mexico, Pa.

### SUPPLEMENTARY REPORT OF COMMITTEE ON CREDENTIALS

In case of Mr. J. Aldus Herr, the Committee reports, that it is their desire, and do recommend the seating of Mr. Herr as a member of this Board, with instruction that he secure the proper credentials (or his credentials from the regular County Agricultural Society of Lancaster county) and that he file said credentials with the Secretary of the State Board of Agriculture at as early a date as is possible.

In case of Mr. Edward Lienhard, from Carbon county, your Committee would say that Mr. Lienhard claims he forwarded his credentials to the Secretary of the State Board, and that said credentials must have miscarried in mail transportation. The Committee recommend that Mr. Lienhard be seated, subject to his filing with the Secretary the proper credentials at as early a date as possible.

SYLVESTER SHAFFER,
F. S. BRONG,
H. G. McGOWAN,
P. S. FENSTERMAKER,
MATTHEW RODGERS,
Committee on Credentials.

**MR. BRONG:** Going back over the list, we find some exceptions to some of the credentials, probably they may be minor. Clinton county, Joel A. Herr, of Millhall, we find no seal upon the credentials. Whether that is anything very serious or not, I don't know; we noted that as we went along, however. Also, from Franklin county, J. P. Young, no seal; from Warren county, R. J. Weld, no seal from the Society. In the case of Lancaster county, J. Aldus Herr, we find that his credentials are not from the Agricultural Society, but from an organization. We are not just so clear upon this point; it is open for the meeting for any discussion. Also from Mercer county we find two sets of credentials; one, however, we recognize as authentic, the name of W. C. Black, of Mercer, from the old Society. The other set of credentials name John E. Vernon, by the Stoneboro Fair Association. We have distinguished between those two, however, in favor of the name of William C. Black, for the reason that his credential is on the regular form sent out by the Secretary of Agriculture. Now all that needs to be settled, I believe, is the case of Mr. J. Aldus Herr, from Lancaster county, that I just spoke of.

MR. HUTCHISON: I move that the gentlemen named, as recommended by the Committee, be admitted as members of the Board, provided if it is deemed wise, that the case of Mr. Herr be taken up separately.

A Member: Which Herr do you mean?

MR. HUTCHISON: Mr. J. Aldus Herr.

The CHAIRMAN: What is the pleasure of the Board. Shall we act on it separately, or how shall we proceed?

SECRETARY CRITCHFIELD: I move that the one case upon which the Committee failed to make any recommendation be referred back to the Committee, and that the Committee shall make such inquiries as shall be necesary in order to satisfy themselves as to what should be done.

MR. HUTCHISON: That would follow. I made a motion that we admit all those gentlemen that had been recommended by that Committee.

SECRETARY CRITCHFIELD: My thought was upon something else at the time and I did not notice that.

Mr. Hutchison's motion was seconded and adopted.

SECRETARY CRITCHFIELD: I move that the gentlemen named be admitted to seats in council with us, with the privileges of the floor and those that were not read but were given by Mr. Rodgers be likewise admitted.

The motion was seconded and adopted.

MR. SCHULTZ: It seems to me there was a misunderstanding about the last action we took. I thought we were voting on the motion the Secretary made and some say we were voting on the motion Mr. Hutchison made; there is one motion that has not been acted upon.

The CHAIRMAN: I would suggest that a motion be made to accept the report of the Committee on Credentials with its recommendation and that the question of the eligibility of Mr. Herr of Lancaster county be referred back to the Committee.

MR. HUTCHISON: I make that motion that the report of the committee be accepted and the eligibility of Mr. Herr be referred back to the Committee for determination.

The motion was seconded and adopted.

The CHAIRMAN: We are coming now, gentlemen, to a discussion on that subject which has occupied the public mind very greatly during the past year, and as I said before, is ever with us, the question of Goods Roads. It is interesting to the pedestrian, to the farmer, to the driver, to the automobilist, and to all of us throughout the State. The automobile people, of course, are particularly interested in good roads. It is the subject of discussion at any of their meetings. I was in Philadelphia not long ago, just at the close of the automobile show, when all of the representatives of the makers were bragging about their own cars and all of that, and there was one manufacturer who, perhaps, excels all others or rather his output in point of numbers of cars is greater than all others, and this representative was very proud of that fact and was claiming superiority and greatness over all his competitors, and he told his hearers that he represented a concern, a house, that turned out an automobile every three minutes and sold a machine every three minutes, a great boast to make and perhaps it was true, but someone sitting beside him said, "Well, you should do better, that is not enough." He said, "Do you mean to say that we ought to do better than make a machine every three minutes and sell one every three minutes?" He replied: "Yes, you ought to make one and sell one every sixty seconds." He asked, "How do you figure that out?" "Well, said the other gentleman, "They say there is a sucker born every minute."

So one should be careful how they boast. I am interested especially in this next report, and what it shall contain. If we are to know just what to do with our roads and what road laws are proper, what will fit and what will satisfy everybody—if this meeting can solve those questions, then it will be the greatest success in the history of agriculture associations, I am sure. We would like to hear from Chairman De Witt, of Mansfield, on Roads and Road Laws.

Mr. De Witt submitted the following report:

## REPORT OF COMMITTEE ON ROADS AND ROAD LAWS

By C. H. DeWITT, *Chairman*

Mr. Chairman, Ladies and Gentlemen: The subject allotted to me is a large one and involves a mighty project, and when the Committee selected me to write or say something upon its merits or demerits, or both, it reminds me of the man in our county court whose word for truth and veracity was being questioned. Wishing to defend himself, he approached one man and told him the circumstances and the man said: "Why, John, I do not know anything about you, hardly know you when I see you." "Just the man I want, don't want you to know anything about me," he replied.

Roads, a subject that has confronted the nations from Abraham to the present time, and has not been satisfactorily solved as yet, and then expect a fellow living among the hills of Tioga county to tell how to solve this problem, and the people neither satisfied nor contented. When we stop and think of the great engineers and men who have made a life study of this mighty subject, and they are at variance as to the best methods to pursue, each state and locality demanding a different system, is it any wonder we get puzzled and confused and the work moves slow.

We hear it said many times, "I would do this or that, had I the power." I believe if there was some fixed rule or system to go by those who have the good road question to solve would be very much pleased, and could give us good roads as fast as the money could be provided. But when you read of the troubles they have to contend with in other states we should be careful how we criticize our Highway Commissioners. They are human, subject to error the same as we. I was reading, not long ago, an article on "good roads" in our sister state, California. They appropriated $18,000,000 for "good roads." The commission reported that if they had not had the support of the counties where these State roads passed through, in the counties building the bridges and granting the right of way and many other acts of encouragement, the good roads question in that state would have been a dismal failure. Are we helping our Highway Commissioners in this State like California, or are many of our public men playing penny politics and holding up a work that should have the support of a united people?

Our Highway Commissioners from the greatest to the least have done well, when you consider that they begin this work without survey or plot and no rule or system tried out with general satisfaction, and no friendly support like other states have given their officers, having in charge this intricate question of good roads. I trust that in the future we, as a people, will give to the cause of good roads the respect and charity that those that have it in charge are entitled to.

Mr. Chairman, I could have given you some history, figures and facts in regard to roads good and bad, what they cost per mile, number of miles built, number of miles to build, how they have built them, and many other things that would be State facts. The machinery for good roads, in the way of maps and figures, are worked out by those in charge.

I have no fault to find. In our country we are making decided progress, give our district Highway Commissioner "money" and "tools" to work with, and in a few years the people who travel the roads he looks after will be pleased with the results. You quite likely have read of good roads and bad roads, by those who have travelled over them, sometimes pleased and sometimes, I, at least, have said things that would not do to say in Sunday school. Let this be as it may. Let each and every man in the State take hold and boost and, if need be, do as they have done in other states, lay off your coats and spend one, two or more days on the roads in manual labor and show those around you that this mighty project must be solved and that old Pennsylvania shall have good roads.

Let us, as a nation, be represented by a National representative to all the National Good Roads Congresses through out the world. Keep up with the times and show to the world that America is in the lead on the question of good roads, as she has shown the world, in the building of the Panama Canal, that she is master of mighty projects that other nations dare not and could not accomplish. I believe no community should invest one dollar for good roads, unless, at the same time, provision is made for their care and maintenance. Good roads have a value beyond our imagination. Bad roads are our drawback to rural development, good roads mean a contended and prosperous people; bad roads mean a dissatisfied, discontented people flocking to cities; good roads mean better farms and better transportation. Bad roads mean poor transportation, lack of help on farms; good roads will help to lower the "high cost of living;" help those who cultivate the soil and feed the people, and whatever help agriculture gets in this country will increase our wealth and power and benefit all the people.

SECRETARY CRITCHFIELD: Before we proceed to the next topic on the program, I want to say that there are but very few people here to-day or perhaps few living who were associated with the Board of Agriculture at the time I became a member, twenty-four years ago. I see a few present, and among those whom I recognize as being present this morning is our good friend from Chester county, Samuel W. Downing, whose voice was heard many times before the State Board of Agriculture, and whom I know we shall all be very glad to greet as we have opportunity. I would, therefore, request that Mr. Downing would just come forward and occupy a seat right here so that we may have the pleasure of looking at him and congratulating him on the prolongation of his life and usefulness, and express the pleasure we have at seeing him, and as soon as Mr. Downing will come here and say a word, I will be glad to have the program proceeded with.

(Mr. Downing came to the platform and was greeted with applause.)

MR. DOWNING: I appreciate the kindness of your Secretary in giving me such a pleasant introduction. I have been looking over the audience here and see quite a number of gray haired members of the Board and visitors, but I do not see—yes, I see one, Brother Joel Herr, who has been with me in past years, and he is the only one, I believe, that I recognize; but I am very glad to be with you and am pleased at the introduction your Secretary has given me.

The CHAIRMAN: The question of roads reported upon by the Chairman of your Committee on Roads and Road Laws will be continued by a discussion practically on the same subject by a representative of the State Highway Department, Mr. Jones, who is next on the program. I presume Mr. Jones will tell you what the State is doing in his Department; but I do hope that before you leave you will come to some conclusion or that there will be a concensus of opinion expressed as to just what Pennsylvania, in your opinion, should do about here road improvements and her road maintenance. Let us have something definite. A definite scheme has been proposed for raising the money and was not acceptible. We have a definite, comprehensive plan of roads; just what they are and how they shall be built and maintained, that is, by what agency, namely the State, and where we have the State roads and the roads running into the townships, how and by what method money will be raised for the building of such roads—if we can have something definite, an expression here from this Board of some real, definite, specified, tangible plan, let us have it before you adjourn. If you think that out of the ordinary revenues of the State sufficient money can be appropriated at every session of the legislature, say so, and say how much money and how you are going to get it, keeping well in mind however that at the last session of the legislature some $89,000,000 was appropriated by your representatives from the revenues of the

State which only amount to some $63,000,000, or $64,000,000, an excess of $25,000,000 more than the revenue.

If such appropriations are to be made in excess of the revenues of the State, how are you to get an appropriation of a large enough amount of money to maintain all the roads to which you are committed, and also to build roads which you expect to build? Are you to take it from the upkeep of our institutions for the dependents of the State, the sick in mind and in body? And where are you to get this money? That is the question. Some people say that there should not be any State aid given to semi-State hospitals, and to a lot of our charities. I doubt if your representatives would agree with that, or if their constituents generally would approve of it. It has been stated that too much is given, perhaps. Well, your representatives gave it. They appropriated for our State hospitals, State institutions and semi-State institutions, $20,000,000 at the last session, and the State Board of Charities recommended some $16,000,000, and the final appropriation approved came within $27,000 of the Board of Charities recommendations, and so it was based on absolute necessity and per capita cost rather than upon the guess work of your representatives.

But I will proceed now with the program and present Mr. Jones of the Department of Highways, and I would ask you gentlemen to be good enough to excuse me at this time and I will endeavor to return and participate in one of your future meetings.

(At this point Governor Tener left and Vice President J. Aldus Herr resumed the Chair.)

Mr. Jones spoke as follows:

## RELATION OF PUBLIC HIGHWAYS TO AGRICULTURAL PURSUITS

By MR. E. A. JONES, *Department of Highways*

Mr. President, Mr. Secretary and Gentlemen of the Convention: I assure you it is a source of great pleasure for me to be allowed to participate in this convention, and I listened with a great deal of interest to the report of the Committee on Good Roads; and I agreed with the Chairman of that Committee in all that he has said, particularly as to the necessity of co-operation between township officers and the State Highway Department in general, in order to bring about the required results. During the past week I attended Supervisors' Conventions in four counties in the northeastern section of the State, and I am very proud to say that I found a splendid, harmonious feeling toward the new Township Act. Of course it is new, and like everything else that is new, it has to be tried out, but I feel warranted in telling you that I believe it is the stepping stone to something much better to come; it establishes a uniform system of working roads in harmony with the State Highway Department, and also in relation to the keeping of your accounts. Hereafter all township accounts throughout the State will be kept in the same manner, a simplified, systematic way that will be a great help to the State Highway Department to have their figures at hand at all times so that they will be able to furnish you with whatever data you may desire.

But as I have been assigned the subject of "The Relationship of Good Roads to Agriculture in General," I presume the architects of this program had it in mind that I should speak of good roads in their commercial relationship to the agriculturist. That being the aspect of the subject, prosperity and good roads and the farmer are independent. In all new colonization movements, the first and most essential thing is to secure shelter and food for the settlers; the next important step is to secure an easy and quick means of communication, one with the other. All land in the, first place, was wild or woodland; that was the condition in which man found it. Its first change was wrought in the transformation from woodland to farm land. The cities sprung from the people's necessity for manufactured articles, clothing and machinery with which to till the soil, harvest the crops and reduce the farm productions to a condition suitable for human consumption became vital necessities. The skilled mechanic is found congregating in centers which we have denominated cities, towns and villages. These, too, are the centers of trade where men find opportunity to exchange the products of their labor for those things which other men produce and which either life, comfort or luxury prompt him to acquire.

When a city has sprung up, it immediately becomes the consumer of the produce of the agricultural lands surrounding it, and, as it increases in population, one of two things become vitally important, either to increase the production of the farm land, or to expand that area. This readily appears, for as the population increases, that which is essential to the maintenance of life must proportionately increase.

We may now profitably develop the thought: The farm produce consuming public in the city depends, first, for its life upon the agricultural area, and, second, it must solve the economic problem as to how the farm produce shall be made accessible to them.

One may be in the open air, and yet, if the facilities nature has provided for the transportation of air into the lungs are not able to perform their functions, suffocation must ensue; not for lack of air and its life-giving oxygen, but because the air is not transported to the point of utility. So, too, farm produce may exist in abundance, but its value to the consumer depends upon its accessibility at the point of utility; that is, the city or town in which the consumer lives. However, its value to the consumer is of no greater importance than to the producer, for the producer depends upon the necessity of his consumer, plus the consumer's ability to acquire.

The problem of accessibility solved, the next step lies in the means of accessibility which I shall now call transportation. It is useless to establish a line of communication between a great army of consumers in the city and their base of supplies on the farm unless that line can be operated at an inexpensive cost. The wagon road was the first line of communication; it is yet first in importance. The next step was the railroad. The latter is an essential aid to the commercial development of the country, and it is an indispensable necessity to modern society. The usefulness of the wagon road and the railroad to society, however, depends upon their operating cost. Here is now suggested the next important problem to be solved in bringing the producer and consumer into their proper relation, and that is, the problem of how the cost of transportation shall be maintained at a price that is in harmony with the consumer's ability to pay.

The cost of railroad transportation is dependent upon too many influences, and railroad lines are not the best means of transporting farm produce to market, especially when the market is not too distant from the farm. But, whether the produce is to be taken direct from the farm to the market, or, from the farm to the railroad, the road over which the haul is to be made is of great importance.

It is but a few years since farm produce had to be hauled in wagons by horse power, now the motor vehicle enters into the equation. A year ago a farmer carried two auto truck loads of produce from his farm to Scranton, a distance of twelve miles. During the same day, in response to telephone orders, he delivered three more truck loads. Up to that time no such speed had been made in that market in bringing the producer and consumer into commercial relationship. This incident illustrates the possibilities of good roads and motor transportation.

But, whether the transportation is to be made by horse-drawn vehicles or by vehicles propelled by motive power, the condition of the road over which the haul is to be made becomes a vital factor in the cost. Bad roads raise the cost and they do it in at least two ways, first, by necessitating lighter loads, and second, by increasing the cost of the upkeep of the vehicles used.

By establishing good roads, the highway becomes an inducement to the agriculturist to transport farm produce in motor trucks, which makes possible more trips to market a day when the distance is not too great. It also has this great economic effect in expanding the agricultural area from which a city may draw the produce for the feeding and maintenance of its inhabitants. and, by thus drawing more lands into its garden area, it increases the value of those lands and enlarges the supply of produce in the market. The effect of this is to exert a two-fold influence in reducing the cost to the consumer, first, by increasing the supply of produce in the market, and, secondly, by reducing the transportation cost. The logic of that must appear in this—to make a rough and soft road smooth and hard is the equivalent of reducing a railroad curve to a straight line—it shortens the haul—for distance may be shortened as well by hours and minutes as by miles.

Thus looking at the proposition of good roads only as it may affect the immediate welfare of the consumer, the self-interest of that usually strenuous "kicker" ought to impel him to heartily advocate the improvement of at least those highways over which the farm produce must be conveyed in its journey from the soil to his table.

A consistent attitude on the part of the public requires it to adopt the doctrine of improved highways. The ingenuity of man has supplanted the flail with the threshing machine, the hand cradle with the reaper and binder. To encourage genius in these inventions, the government has protected the product of the inventor.

At first thought we may regard these inventions as labor saving devices; yet they are more than that—they are the means of increasing the productions of our farms and are essential to make farm productions keep pace with the growing necessities of an increasing population in the consuming centers.

We have encouraged these inventions because they are such important factors in the labor of keeping our food supply up to the requirements of society, and, within the last few years, we find our governmental energies being directed toward a scientific development of the art of agriculture. Almost all schools and colleges have incorporated in them a course in soil culture. Intensive, scientific and intelligent agriculture has become a necessity. Brains and science in agriculture are not being nurtured by our government merely to advance the prosperity of the farmer. His prosperity is an incident, although the greatest reason is to keep the food supply of the people at least equal to their requirements.

Yet how idle, how utterly useless to devote the time, labor and treasure toward increasing the production of the farm and ignore the economy of the very means by which that increased produce is to be transported to the beneficiary. It is but a wasteful extravagance to produce great crops, garner them into bulging barns, there to waste and decay, while, in the cities are multitudes of men and women hungering because the abundant harvest cannot be made accessible at a cost which they can meet.

Hard, smooth, substantial roads are not a luxury, they are as much a necessary element in the problem of feeding the people as is agriculture itself. The producing farm and the good road from that farm are inseparable—the one is useless without the other. The relation is as oxygen to the human body, as hydrogen to water, as sunshine and rain to vegetation. The very thrift and energy of the farmer, aye, the very production of any farm depends upon the facility afforded that production to move to its consumer. The relation is not only close, it is vital; they are both parts of a great economic plan of our government, the economic plan of feeding our people.

The relationship established, the necessity exposed, the question presents itself—who should carry the burden of cost of good roads. I do not propose to consume time in arguing out the thought. I have shown you who are the beneficiaries of good roads, and, if I have been clear, you must have grasped the idea that every man, woman and child who eats the products of the farm are the beneficiaries of economic transportation. The farmer in the country, the skilled artisan, the merchant and professional man in the city are all dependent upon the conditions of the highways. Therefore, they should all bear the burden of their maintenance. The road is no longer a local institution to be maintained by supervisors and repaired by men who work upon them in lieu of paying cash for taxes. The burden rightfully belongs to all, their duty requires them to carry it, be it light or heavy, and, the only means our constitution provides whereby each can carry his proportionate part of that burden is our State government.

A glance into the future discloses one thing which we must quickly realize. The roads must be adopted as the highways of the State.

The relation of good roads to agriculture is so vital that we may no longer expect the farm to rise to the requirements of the consuming public until an easy, cheap and ready outlet shall be provided for its crop. The time has come, the inevitable is apparent, Pennsylvania must welcome and support the natural offspring of its problem of feeding the people, the STATE HIGHWAYS.

The CHAIRMAN: Gentlemen, that is the end of our program for this session. Is there anything else before we adjourn?

SECRETARY CRITCHFIELD: There will be a little time for discussion of the subjects that we have gone over this forenoon or for questions.

The CHAIRMAN: We will now give a little time for the discussion of the different questions that have been before us. The first one is the report of the Specialist in reference to fruit. Do you want to discuss Mr. Tyson's topic? We will take that first, if there is anyone to discuss it. That is certainly an important question, the growing of fruit. If no one desires to discuss that, we will pass to Dr. Frear's topic.

A Member: Do the experiments with raw ground Tennessee rock show whether all of the phosphates it contains ultimately become available or not, or, if not all, about what part of it?

SECRETARY CRITCHFIELD: Mr. Chairman, Dr. Frear has had to leave the room; I believe he is a witness on a case that is being tried in Quarter Sessions Court, and so I think he is not here.

The CHAIRMAN: Is there anyone present who can answer that question? If not are there any other questions?

MR. JOEL A. HERR: I saw Prof. McDowell in the room awhile ago; I think possibly he might be able to answer that question.

The CHAIRMAN: If he is not present we will pass on to the next subject, the report of the Committee on Roads and Road Laws, by Mr. De Witt, and with that we might include Mr. Jones's paper on the road question. Now here is some food for thought.

MR. KILLAM: In relation to this road question, I move you now, Mr. Chairman, that a Committee of five be appointed to confer with the Commissioner of Highways and devise or adopt some plan of recommendation on this road question as to some way or means of providing and raising money for the maintenance and repair of such highways as we have, if nothing more, and the Committee to report at this meeting.

Motion seconded.

The CHAIRMAN: It is moved and seconded that a Committee of five be appointed to act with the Commissioner of Highways in reference to some means in reference to the road laws.

MR. FENSTERMAKER: While I have no one plan to solve the road problem and we are all agreed, I think, without regard to party affiliations, we are all in favor of good roads, we disagree, however, on the manner of paying for those roads. That is the visible line of disagreement, I think, and the Governor's suggestion, or he threw out the hint about the vast amount of money appropriated for semi-charitable institutions—it seems to me, it showed to my mind that that was a rather questionable thing to do, the State appropriating, as he said, $20,000,000 to semi-State institutions where the State has practically no control. I can speak from experience. A surgeon or two will run that hospital, they control the hospital, practically. Anybody having an operation to perform for a member of his family or himself, they get the fee, the surgeons get the fee; all the institution gets is probably for the use of the room or the cot or attendance; the principal item of expense, the operation, goes to the surgeon; the State does not derive a cent of benefit from that and neither does the institution. This thing has become objectionable more or less, at least in our section, and they have what they call hospital days when all the churches are supposed to make a collection on a certain Sunday, but the donations have been getting less every year. That system of running hospitals is not a business-like way of doing it.

I know this is getting away from the road question, but just to show where monies are being diverted—why not have a business-like way of running these hospitals? Employ a surgeon and make people pay for operations who can afford to pay and then have the whole municipality feel that they own or control that hospital and not actually believe that is run upon that plan, and they would not be obliged to call upon the State for these large appropriations every two years. What takes place? These hospital associations see their members of the legislation and perhaps put pressure upon them, tell them "Get all the appropriation you can for our hospital, we have got to have it, if you don't, we are going under." The same thing is done in the other counties, and what takes place in the Assembly? Log rolling. "If you don't vote for ours, we won't vote for yours," and the result is they appropriate almost twice as much as the State's income. The very plan is a temptation to go wrong, and I would like this Committee, when it is appointed, to bring out how to derive means to pay for these roads; that is the important things. We are all in favor of good roads.

**MR. KILLAM:** My object in making this motion is that this Committee get in close touch with the Commissioner of Highways—they may not agree with the Commissioner of Highways and the Commisioner may not agree with them. I believe that the Commissioner of Highways has done good work, and I believe that anything this meeting can do to lend him a helping hand or they to lend the Department a helping hand will be of benefit to all of us, and I believe if this Committee gets to work and does their work fairly well, they may do some good.

**MR. HEILMAN:** I wish to make just one brief remark and that is with regard to taking anything away from the State hospitals. I was talking to a surgeon on the staff of one of those hospitals recently and asked him how much more money he made by being on the staff than he did before, and he said, "I make about half as much and do about twice as much work."

MR. KILLAM: We are getting away from the question.

MR. HEILMAN: One of the gentlemen said something about wanting to take money away from the charitable institutions and use it on the roads, and the point I want to make is that we should take nothing away from this one particular charitable institution. We all get the benefit of good roads, every man who travels the road, every man who walks on the road or uses it in any manner gets the benefit of it, and yet no farmer, no man pays a cent toward the State tax unless he has got money at interest, and I think there ought to be a per capita tax on every male citizen over twenty-one years of age for the purpose of road maintenance. I simply offer that as a suggestion, but I did not want to leave this question of taking anything away from the charitable institutions go without protest, because there are so many operations done in these hospitals for which the surgeons get no pay and these people are the ones who are not able to pay and they are the ones that the State pays for.

MR. BLYHOLDER: In regard to the Committee, as the question is now it seems to me that this is such a great question it would be impossible to accomplish anything by a Committee that had to report at this meeting. Now I move you, as a substitute for this motion, that this Committee of five be appointed for the purpose of interviewing the Commissioner of Highways and the Department, also to take into consideration the condition of taxation in Pennsylvania, and report to this body in one year from this date.

MR. STUDHOLME: I would like to suggest that if it is the wish to say that this Committee, if appointed, will get some information, will get some light and may do some good and report at this meeting, and they certainly will not overwork themselves; they won't report further than they can, and then it would be a good plan to continue the Committee in case they don't complete their work, which I doubt if they would.

MR. STUDHOLME: I would like to suggest that if it is the wish of this association to have this Committee appointed that they report not later than to-morrow afternoon, so we will have some time to discuss the report. I would like to have that added to the motion.

MR. KILLAM: The motion was to report at this meeting; they will report as soon as they can.

MR. BLYHOLDER: I would like to ask the gentleman to incorporate the other gentleman's suggestion to report not later than to-morrow afternoon, because usually at the tail end of these meetings is when they are all gone home and two or three reports come in of very vital importance.

MR. KILLAM: I will accept that amendment.

Mr. Killam's motion was then adopted.

The CHAIRMAN: The Chair will appoint that Committee and announce it after dinner. Is there any other business?

MR. JOEL A. HERR: I don't want to discuss this question to any great length, but I think that one of the considerations for this

Committee should be the relation of the local road people, the supervisors, the township authorities and county authorities with the State. The disposition seems to be to take the work of the township and local authorities out of their hands and transfer it into the hands of the State and operate everything from State headquarters. That is one of the objections that has been urged and ought to be considered. Another important suggestion is, that we are not educated yet in road building. We have not got down to the kind of a road we want that is enduring; we want to get down to the cheapest practical, durable road; that is one reason for the dissatisfaction with road making. I would like to have that considered by this Committee in their report.

I would like to hear a word on road making from Brother Downing. Brother Downing was one of the early advocates of macadam roads. Early in the Board I remember he made several addresses on this subject, and one was out in the western end of the State and the subject was macadam roads, and some fellow read it and didn't pronounce it right and the question as he read it was, "How to make a Dam Road," and he said, "That's the kind of a road we have already got."

MR. KILLAM: I think the legislature has taken care of that matter very well in the last session. The legislature has been very friendly toward our Township Supervisors, and that is enacted in our law, and the way the law is, they are in close touch with the Department.

SECRETARY CRITCHFIELD: About the time this discussion began I was called into the lobby and did not hear what was said and do not know exactly what the state of affairs at the present time is. It does seem to me that to attempt to make a report—for a Committee to make a report of the magnitude and of the importance of this report that is being contemplated now, will require more time than can possibly be given to it here; and, inasmuch as we will meet again in about four months, which will be long before the meeting of our General Assembly, it does seem to me that there ought to be a Committee appointed which would take plenty of time to study this question, and if it be necessary, let them come here and spend several days. I think that we will have the means of paying their expenses. Let them come here and study this question and get such information from the Highway Department and from every other source as they may find necessary to make up a report that will really mean something. This is a very important matter. The State Board of Agriculture is a State institution. It is created by Act of Assembly, and any expression coming from this Board ought to have very great weight with the General Assembly, and it does seem to me that it will be hasty action if this Committee should attempt to report upon a matter of so much importance at this meeting. This will be a matter for you, gentlemen, to determine, but I wanted to express my own thought.

MR. KILLAM: That suggestion is very good. In my judgment that Committee will make only partial report or merely a progress report. That Committee cannot report on a matter of this kind in one day or two days. The Committee would be wise enough, no doubt, to simply report progress; but get the thing in operation as an entering wedge to a good report and do some work on the matter.

MR. MATTHEW RODGERS: I think the gentleman's motion for a Committee to report at this meeting is suggestive. The State Board has a Legislative Committee which is a Standing Committee, and this committee, which is to report to-morrow afternoon, will bring up subjects on which we may want to make suggestions to the Legislative Committee of the State Board of Agriculture, which will be appointed later on, and it will all work together properly if properly conducted and we try to understand each other in the matter. The gentleman who made the motion I don't think expected to have a great, elaborate report come before this Board to-morrow afternoon; it will merely be suggestive to the Legislative Committee of the State Board of Agriculture, in my opinion.

SECRETARY CRITCHFIELD: Here comes in the difference of opinion as to what the functions properly are of a Legislative Committe. My thought always has been that the body itself, whether it be the State Board or whatever body it may be, shall first express what it wishes; what legislation it thinks is proper; then it becomes the business of the Legislative Committee to endeavor, by every rightful means, to secure the passage of such legislation. I do not think that it is the work of the Legislative Committee to make up and finally pass upon themselves without reporting the whole thing back to the State Board, just what legislation the State Board wants. Therefore, my thought is that this Committee ought to be able to take up this subject, having plenty of time to go over it carefully, get information from every quarter from which they can get information, and then make a report at the next meeting of this Board as to what is the opinion of this Board upon the subject, and then let the Legislative Committee take it up and secure its passage by the General Assembly, if possible. If I am wrong, it is all right for some other course to be taken.

MR. BLYHOLDER: That's exactly my motion.

MR. JOEL A. HERR: I do not think that Mr. Killam's motion contemplates making a full report at this meeting, but it does contemplate allowing the members of this body to ventilate their ideas on the road question, so that, by a concensus of opinion, they can have something upon which to act for a future report.

MR. BLYHOLDER: Certainly; by the creation of the Committee they have got to report at this meeting; they have no longer life than that according to the motion that created them; that is the reason I made the motion that the Committee be appointed and continued for one year, then they will have a chance to do something.

SECRETARY CRITCHFIELD: If the Committee will report progress and continue their work and make a report at the May meeting, that will be all right. I didn't hear the motion.

ASSISTANT SECRETARY WELD: The motion as I have recorded it is this: Moved by Mr. Killam that a Committee of five be appointed to confer with the Highway Commisioner as to the best method of raising funds for the improvement of roads, and report not later than Thursday afternoon session."

MR. KILLAM: Report to this body. They might make such a report that this body might be glad to get rid of that committee at once and appoint another. When you stir up this road question, you stir up an awful affair; we don't know what it may lead to or how much discussion it may bring on, and if the Committee was continued, it would be instructed by this Board to report at some other time.

MR. JOEL A. HERR: I want to ask the gentleman whether he intends it to be a committee to consult with the Highway Commissioner, simply? Isn't it to consult with every member of this Board, every member of this body, and this body express their opinion?

MR. KILLAM: My intention was for that Committee to get everybody before it that wanted to come and go in with the State Highway Commissioner, let him know we were not firing any shots at him, get in touch with him and get suggestions from him and make a report as far as it could, which would not be very much, at this meeting.

MR. FENSTERMAKER: If I understand the wording of that resolution, it covers one item of the question, how to provide funds, and the Committee is limited to that. Don't lose sight of that, gentlemen. Besides, we have a Road Committee appointed to make a report at every annual meeting.

MR. RODGERS: My understanding was that the Committee the gentleman suggested were to be appointed to report tomorrow afternoon, to go before the Road Commissioner and find out what was wanted and then report back to this body and this body to deliberate on that subject. No Committee can be stronger than the body that appointed them, and that will be brought before this body and placed on the minutes, and then that report and any other matters can be referred to and taken up by a permanent Legislative Committee that you have in your organization and then acted upon. I think we misunderstand each other. The Chairman said that when we came here to work we came for a purpose, and now that we are here, let us stay till we are through if it takes all this week and part of the next.

The CHAIRMAN: Is there any other business before the house?

SECRETARY CRITCHFIELD: Before adjournment, I want to call attention to the fact that the Committee on Credentials returned with their recommendations, the credentials of W. A. Fisher, from Northumberland county, while our records show that Mr. I. A. Eschbach is at present a member of the Board from Northumberland county and that his term will not expire until January, 1916. I therefore, move that this matter be referred back to the Committee on Credentials and they will make inquiry as to how this happened.

The motion was seconded and adopted.

MR. RODGERS: I understand that our Brother, H. C. Snavely, is under affliction at the hospital, and I would suggest or move that the Secretary of Agriculture send him assurance of this body, and our earnest hope for his speedy recovery.

Motion seconded and adopted.

The CHAIRMAN: The Secretary has a letter to read.

Assistant Secretary Weld read a letter addressed to Hon. A. L. Martin, from Mr. C. S. Messinger.

MR. BRONG: In regard to the Credential Committee—If we go back to confer upon our worthy Chairman's credentials, we will be in the same position we were in before, and we would like to have information on the subject. I see that the Act creating the Board says "appointed from or by each agricultural society in the State." Now, is the organization that Mr. Herr represents, the Farmers' Union, an agricultural society, or is it simply an organization for buying and selling?.We would like to be guided by your opinion. We would not like to miss Mr. Herr's presence, in fact, we cannot spare him, but would like some information on the subject.

The CHAIRMAN: I got my credentials signed by our Association. We buy and sell and also have a monthly meeting there for general information, and it is the same association that gave me my appointment or credentials the first time I was a member of your body. The name of the organization is the Lancaster County Farmers' Association.

MR. BRONG:I thought the credentials came from the Fair Association.

The CHAIRMAN: These credentials did not come from the Fair Association, but from the Lancaster County Farmers' Association.

SECRETARY CRITCHFIELD: It seems to me that this matter ought to come before the Committee. If the Committee wishes any information on that subject and will simply announce the time and place of their meeting, Mr. Herr can appear there or anybody else, to aid the Committee in coming to a conclusion. Mr. Brong, are you prepared to make an announcement of the time and place, or whether you wish any assistance?

MR. BRONG: I only speak for myself; I can meet at any time and place.

The CHAIRMAN: Will Mr. Brong make his announcement when to meet him?

MR. BRONG: I think we will meet at one o'clock in the Secretary's office. We would like to have Mr. Herr present.

The CHAIRMAN: Is there any other business? If not, a motion to adjourn is in order.

The Board then adjourned until one-thirty P. M.

Wednesday, 1.30 P. M.

Vice-President J. Aldus Herr in the Chair.

The CHAIRMAN: The meeting will come to order. I will announce the Road Committee, that was to be appointed by the Chair, to confer with Mr. Bigelow. It is as follows: Mr. B. F. Killam, Chairman; Mr. C. H. DeWitt, Mr. S. S. Blyholder, Mr. P. S. Fenstermaker and Mr. Matthew Rodgers. They are supposed to report at tomorrow afternoon's session.

MR. KILLAM: I want to give the Committee notice that we will meet at the first chance we get and as soon as we get in touch with Commissioner Bigelow. I will call a meeting of that Committee at three o'clock this afternoon at Commissioner Bigelow's office. Now, if we go there and he is not there, we will know it—three o'clock this afternoon at Commissioner Bigelow's office. Is there anything that interferes with that?

The CHAIRMAN: Nothing that I know of. I see the first thing on our program this afternoon is the election of officers. I believe we elect a President and Vice-Presidents.

MR. HUTCHISON: No, the Governor is President. We elect three Vice-Presidents. While I am on my feet, I will nominate Hon. J. H. Wilson, of Clarion county, for Vice-President.

Mr. Killam, of Pike county, and Mr. George, of Indiana county, were also nominated as Vice-Presidents, and it was moved and seconded that the nominations close. This motion was adopted, and, on motion of Mr. Hutchison, Assistant Secretary Weld cast the ballot of the Association for the gentlemen named as Vice-Presidents for the ensuing year, and they were declared duly elected.

The CHAIRMAN: Gentlemen, you have heard the result of the election. Will those gentlemen please come forward and take charge of the meeting and we will vacate.

Vice-President Wilson takes the Chair.

MR. HUTCHISON: I move that we proceed to the election of an Executive Committee.

Motion was seconded and adopted.

SECRETARY CRITCHFIELD: I wish to suggest that, in the election of an Executive Committee, it is well to be sure that all of them shall be persons whose membership on the Board will continue beyond January, 1915, for the reason that if they should attend the 1915 meeting and some other person should be elected to represent the county which they are representing for the term, beginning January, 1915, it would cause the presence of two persons from the one county, and matters of that kind sometimes give us trouble when we come to have the accounts audited.

MR. HUTCHISON: I don't like to differ with you.

SECRETARY CRITCHFIELD: Well, it don't make any difference if you do; those are the facts.

MR. BLYHOLDER: According to the Secretary's statement, those whose terms expire in 1915, are the ones that should be omitted from this Committee.

SECRETARY CRITCHFIELD: That is the understanding.

A Member: As Chairman last year, we took with us when we retired for action, the list of new members, and I think it would be well to follow that out this year.

SECRETARY CRITCHFIELD: You will understand now that persons who have been admitted during this session will be members one year from now and will be expected to attend, but it is those whose terms of service will expire with the year upon which we have entered. Am I clear with regard to that matter?

MR. HUTCHISON: A man is a member of the Board for one year, until the meeting in January next.

SECRETARY CRITCHFIELD: Therefore, persons who have been admitted to membership at this meeting will be eligible. I am just stating this as a matter of policy, so that we will not get into trouble when we come to have our accounts audited.

MR. JOEL A. HERR: I rise to nominate, I think, perhaps, the oldest active member of the Board,—A. P. Young, of Columbia county, as one of the Executive Committee.

Messrs. M. M. Naginey, H. G. McGowan and S. S. Blyholder were next nominated.

MR. HUTCHISON: We have one lady member of this Board, and I nominate Mrs. Jean Kane Foulke, of Chester county, as a member of the Executive Committee.

Messrs. W. F. Holtzer, John Shoener, J. Newton Glover and Geo. F. Barnes were also nominated, after which it was moved and carried that the nominations close. A motion was then adopted that Assistant Secretary Weld cast the ballot of the Board for the above nominees, which was done and they were declared duly elected.

The CHAIRMAN: Next on the program is the report of the Veterinarian, Dr. C. J. Marshall, of Harrisburg.

Dr. Marshall read his report which is as follows:

## REPORT OF THE VETERINARIAN

By DR. C. J. MARSHALL

Mr. Chairman and Members of the State Board of Agriculture: As your Veterinarian I should like to talk with you a few minutes about the transmissible diseases of animals. There are about 130 such diseases known. We have but a few in Pennsylvania, ten of which are provided for by the laws of the State. Most of these diseases are familiar to you, but the annual losses from them are a great deal more than we can afford to permit. It is estimated that we lose about $5,000,000 worth of livestock annually from diseases that should be prevented. There are some of the transmissible diseases that can be controlled by the owner, as influenza and lockjaw. The State gives advice in treating or diagnosing any disease where many animals are sick or dying in any locality.

A certain class of transmissible diseases are of interest from a national or international point of view. During the last year we have had none of that class. Many of you remember when we had trouble with contagious pleuro-pneumonia in cattle. The last case of that disease was exterminated from the United States in 1891. Foot-and-mouth disease has occurred in Ireland and in England since our recent experience with it. In Germany and South America the disease is still prevalent and they are losing thousands of dollars annually because they don't know how to control it. The transmissible diseases that are most common in Pennsylvania are tuberculosis, glanders, hog cholera, rabies and contagious abortion.

There has been nothing new developed during the year in reference to handling tuberculosis. The State is trying to enforce the regulations and rules that have been in force for a number of years. We still consider the old-fashioned tuberculin test as the best method for diagnosing tuberculosis. For a number of years when the State was to pay indemnity for tuberculous cattle, the owner has had to sign an agreement to do certain things. First, the application has to be made by the owner himself. He applies to the Board and says that he believes he has tuberculosis in his herd and would like State assistance in getting rid of it. He is told that if he will co-operate with the Board the help will be given. He obligates himself in the form of agreement to remove any animal that has tuberculosis, to clean up his place, disinfect the premises in accordance with the regulations of the Board, and to put no animals in his herd until they have been officially judged free from tuberculosis. The State will give under such restrictions indemnity for condemned cattle, but it is not sufficient to cover all his losses, yet it is more than many other states are willing to give. The indemnity is limited to $70 on registered cattle and $40 for non-registered cattle, and the owner can get something in addition to this amount for the meat and offal.

The last year we tested about 20,000 head of native cattle under the above conditions and found about 12 per cent. of them tuberculous, and they were destroyed. It looks peculiar when we find 12 per cent. of our own cattle tuberculous and at the same time but one per cent. of the disease in cattle brought in from other states and tested. This should not mean that we have twelve times as much tuberculosis in Pennsylvania as there is in other states. Tests made on Pennsylvania cattle were in herds where the owner and our agents believe that tuberculosis was present. Dealers know that cattle brought into Pennsylvania will be tested, and if condemned, no indemnity will be paid for them. The only thing they can do is to have those quarantined that are condemned or have them destroyed and sell them for what they can get out of the meat. Consequently, dealers are hunting herds free from tuberculosis. It is remarkable that they can find herds so free from tuberculosis as is indicated by the test made on interstate cattle. We know that tuberculosis is carried from animal to animal in a herd and that it may be carried from farm to farm or from state to state, and any way that we can shut off the source of infection would help the agricultural interests.

A great deal has been accomplished in the last few years with light and ventilation and general farm sanitation. Sunlight and air are the best natural disinfectants we have and the cheapest. Tuberculosis is spread from herd to herd in several ways. It is often introduced into a herd by buying animals from infected herds into those that are free from the disease. People who are interested in getting tuberculosis-free herds should buy only on the tuberculin test if it can be done. The disease is spread from herd to herd through the milk. Skim milk from a creamery is the most common source of danger. The milk from one tuberculous cow may contaminate all the skim milk returned from a creamery for food for calves and pigs. The last legislature made it necesary for creamery men to pasteurize milk before it is used for pigs or calves, and we are trying to put that law into operation as fast as good judgment will permit. It can be done cheaply and should prevent one important means of transmitting tuberculosis from one farm to another. The Bureau of Animal Industry reports one place where 75 hogs fed on skim milk from one creamery were sent to a slaughter house which was under Federal inspection and 60 were condemned for tuberculosis. If the creamery man cannot arrange to pasteurize the skim milk it can be easily done at home by heating it to 180° F. for not more than a minute.

Glanders is not very prevalent in Pennsylvania. The State pays an indemnity not to exceed $60 for animals killed for glanders. During the last year we adopted a more accurate method for diagnosing the disease. It is what is known as the ocular mallein test. It consists in placing a few drops of mallein in the eye. If the animal has glanders it will show a mucous discharge from the eye. It has no effect on the eye of a healty horse. We can also make a diagnosis of glanders by a blood examination. This is considered the most reliable test known for diagnosing glanders and contagious abortion. A horse may be a dangerous spreader of glanders, yet show no symptoms that are commonly found in the disease. Glanders is comparatively easy to recognize when external lesions are present.

Pennsylvania is not considered a large hog raising state. Our last census showed that they were valued at about $6,500.00. The State of Iowa lost $16,000,000 worth of hogs last year from hog cholera alone. Hog cholera has occurred in a good many counties in Pennsylvania during the last year, but so far we have been able to control it with a serum injection, quarantine and disinfection. An outbreak of hog cholera should be reported promptly to the State Livestock Sanitary Board, and if properly handled, 80 per cent. or 90 per cent. of the hogs can be saved. If the disease is allowed to run a week or two before anything is done, the owner then may lost 60 per cent. or 80 per cent. of his hogs. The herd is put under quarantine where the disease occurs and the quarantine is kept on for thirty days after the last case has been observed. We consider the premises free from infection in thirty days after the last case of cholera was seen provided the necessary precautions for disinfection have been observed.

There was less rabies reported last year than in previous years, and we think it is because there was a vigorous campaign made against the disease a year ago. A number of people were bitten by rabid dogs, and in a good many cases, the county had to pay for the Pasteur treatment for those people. There is no reason why rabies should not be controlled completely. The disease is only transmitted by rabid dogs, and if people would take care of their dogs there is no reason why it should be spread. Scavenger dogs that have no homes are the principal spreaders of the disease. Probably they are to blame for most of the outbreaks, yet occasionally a dog that has a good home develops the disease and escapes from his master and goes over several miles of territory biting persons, dogs and other animals and spreads the disease badly. A good many counties in the State are adapted to sheep raising, but dogs destroy so many sheep that it makes the business unprofitable. The law passed in 1909 making it necesary for dogs to wear collars or compelling constables to destroy them if not licensed, is a dead letter in nearly every county.

Anthrax and blackleg occur only in isolated sections of the State. Instructions are sent every year by the Board to those farmers who have had trouble with either of these diseases in previous years and they are advised to have their animals vaccinated. This work is done at the expense of the State. There is very little danger from either of these diseases where the animals have been vaccinated at the proper time.

DR. CONARD: The Doctor spoke of pasteurizing the milk for the calves. How do you keep that milk through the day?

DR. MARSHALL: We have just started the work and no definite plan has been adopted.

DR. CONARD: How would it do, Doctor, to put that milk, immediately after it is heated, into something similar to a fireless cooker or a box made with non-conducting wall, and keep it above 140 or 120. If kept that way above the temperature at which the germs would grow, would that affect the digestibility of the milk or would that keep it in pretty good shape for feeding?

DR. MARSHALL: I don't know how that would turn out. If milk is heated to 140° for twenty minutes the tubercle bacilli would be destroyed, and it would not be reinfected as long as it were kept at that temperature.

DR. CONARD: Suppose it is heated up to 150 and set in this box to retain the heat and you keep the milk all day above the temperature where germs can grow; if it gradually cools down by night again, if it is in a bad atmosphere, it will be reinfected, and I thought that by keeping it at that high temperature, we could have it as sterile in the evening as it was in the morning.

DR. MARSHALL: Perhaps that would be a good thing to do.

MR. HEILMAN: I would like to ask Dr. Marshall whether he has any means of knowing whether the animals tested for tuberculosis in other states had been tested by the tuberculin test before coming here and whether or not the animal reacted the second time?

DR. MARSHALL: Nearly all states require that tuberculin tests shall be reported to those who have charge of the diseases of animals. That rule is not absolutely followed in all states and there is a good bit of testing done in other state and not reported to anybody except the owner. An animal that has been through a test of that sort and submitted to another test may have tuberculosis and fail to react. A certain percentage of them have the disease and will not react at all, but after two months you can test them again and they will usually react but not always. The first test on animals is always the most accurate of any test that can be applied.

MR. HEILMAN: Have you any means of finding out whether they had been tested before?

DR. MARSHALL: No positive method.

MR. GEORGE: I would like to ask in regard to hog cholera. May it not come sometimes from a very unexpected source? The point I wish to make is this: there was an outbreak in our neighborhood sometime last fall, about half a dozen different farmers had an outbreak of cholera and in every case they traced it back to where the people had been feeding meat scraps to their chickens.

DR. MARSHALL: It is very confusing sometimes to account for an outbreak of hog cholera. It may jump from one section of the country to another in mysterious way. It is usually carried by an infected hog, but it may be transmitted by buyers, infected grain bags, dogs, cats, pigeons, sparrows and uncooked garbage, meat scraps, etc. It does not spread through the air unless carried on some contaminated body. We have often had dogs sick and dying with cholera in one pen and susceptible hogs under the same roof and separated only by a cement wall as high as a man's head and remain healthy.

MR. HEILMAN: The thought I had was this—that meat scrap was made from hogs that had been infected with cholera and reared in that way.

DR. MARSHALL: The danger of infection might be eliminated by cooking the scraps.

DR. BECK: Would there be any danger in getting corn from the West?

DR. MARSHALL: Corn that comes from sections where cholera exists might be infected.

MR. MARTIN:I would like to ask of it would be good practice for persons when they have no disease on their farms to use vaccine?

DR. MARSHALL: If you give serum to those that have the disease or have been exposed to it those that recover will have a permanent immunity. If you give the serum to those that do not have the disease or have not been exposed to it the immunity produced by the serum will only last three or four weeks. We have been using the serum only where the disease existed.

**MR. COWAN:** I would like to know by what method we are going to prevent the spreading of the disease when the veterinary surgeon called in pronounces it something else than hog cholera, and permits that state of affairs to continue for several months and the neighbors don't know there is hog cholera in the neighborhood from the fact that the veterinary surgeon says it is not but is simply an affection of the lungs?

**DR. MARSHALL:** That is a hard question to answer. You better get a better veterinary surgeon.

**MR. COWAN:** The Doctor no doubt has some recollection of a little incident up in our section of the country, a veterinary surgeon treated a drove I had up there and the surgeon asked me where I had gotten them. I said from those people that didn't have it. In the neighborhod there were some six cases and the veterinarian pronounced it pneumonia and it scattered all around the neighborhood for miles. This neighbor sold some pigs from his farm and I think that nearly every place where they were sold the hogs became infected—I think they were Berkshires. I had never had anything of that kind in there before and asked a veterinarian to come and look at them. I said, "I think I've got hog cholera." "Where would you get it," he asked. I said, "From the man that didn't have it." I sent for doctors from the State Livestock Sanitary Board and they told me that it was hog cholera. I would like to know if there is some way by which we can get the proper diagnosis on those sick animals when the doctor is called in. It was a matter of the loss of 44 hogs to me by not knowing what was in the neighborhood.

**DR. MARSHALL:** The only thing I can say to the gentleman is that I think the better veternarians know hog cholera when they see it, and if you will notify the State Livestock Sanitary Board at Harrisburg they will send an agent to make an investigation; or if you will send a sick or dead pig to the laboratory of the State Livestock Sanitary Board, 39th Street and Woodland Avenue, Philadelphia, the Board will pay the express on the package and send you a diagnosis as soon as possible.

**MR. COWAN:** They did that with me very promptly, too.

At this point a motion was adopted that the Board proceed to the election of an Assistant Secretary, as was done last year, and Mr. Weld was unanimously re-elected.

**The CHAIRMAN:** It has been suggested that as the members of the Board are about all here, the place for the June meeting be selected now.

**MR. BRONG:** I rise to nominate a place for the Spring Meeting which was before this Board last year. We have a section of country, the county seat of which is at the edge of a country which is noted for scenery and to which thousands of people yearly come from the cities to spend a certain time. Stroudsburg has a community surrounding it, which, for natural beauty is perhaps not surpassed in the State. We have within a five-mile radius the Delaware Water Gap, which is visited and admired by many people every year. Right below the Delaware Water Gap was, up to the time of its completion a few years ago, the largest concrete structure in the world. I refer to the D., L. & W. railroad bridge across the Delaware River.

The people of our county seat are not slow, which you will notice when you meet them. The town holds two world's records. We have in our borough a woolen mill which holds the world's record for completing a suit of clothes in the shortest time. A few years ago the President of that Company arranged with his employes to convert wool into a finished suit and they arranged for that to make a record time, and the record time they did make. The wool was taken —the sheep sheared—soon after opening in the morning, and in the evening the President of that concern sat down to his meal with the finished suit, beating the world's record by an hour and some minutes. Soon after that, one of the newspapers of the town also wanted to make a record and it also was a world's record, and they arranged with a paper mill, which is located close by, to convert timber into paper, and this also was accomplished in less than a day; the evening paper was printed on paper the wood for which was cut in the morning. I have at the hotel, but I didn't bring them over here, but on the suggestion of the Deputy Secretary, I went to see the hotel people in our town, in the borough, and I have their signature and I have their rates for accommodations in the old town for 210 guests. The rates run from $1.50 to $3.50 per day, $2 being the average. In the Borough of Stroudsburg, which is just across the river, two or three minutes' ride on the car and five minutes' walk, we have accommodations for 200 people more; at the Delaware Water Gap, which is about five minutes' ride on the street car, there are accommodations for about 500 guests more, so you see the community would be amply able to take care of this body. Our people are very anxious to entertain you and I assure you that if you come you will be royally received.

MR. KILLAM: I would rise to second the suggestion of Mr. Brong for a meeting at Stroudsburg, Monroe county. All he has said about that section is true, and even more; it is a good agricultural section around there. The people are looking for the State Board to meet there some time. Mr. Brong has made the effort for three or four years and has not met with any success, and I do beg of you to let that meeting go to Stroudsburg next May. We have the beautiful Delaware Valley there; we have forty miles of the finest road in the State and that road is not made by the State, either, it is beautiful by nature, and we have ample railroad facilities for getting there, the D., L. & W. and Pennsylvania. There is no trouble about getting there and getting away, and we have hotel accommodations second to none. There's The Indian Queen, as good a hotel as you will find anywhere, and there are others nearly as good. The accommodations are excellent and the beautiful Delaware Water Gap, the Switzerland of this country, and the Delaware Valley from there to the New York State line is as pretty a valley as you will find in this Commonwealth. Those are facts which can be vertified by the men who have been there and seen it, and I will second all that Mr. Brong said in the matter and even more, and the agricultural sections round about there are very good.

MR. SCHULTZ: I wish I were an orator, but I am only an up-country Dutchman, but Norristown, Montgomery county, is making a bid for this meeting, and we have something they don't have at Stroudsburg. Stroudsburg is a nice place, and as far as I personally am concerned, I'd rather go to Stroudsburg than to Norristown, be-because if this meeting comes to Norristown, it means work for somebody; but what I am going to say is this: we have ample accommodations for you at Norristown. It is easy of access, especially from the western part of the State; you can come right down to Philadelphia and up to Norristown, which is only a few miles. We have splendid hotel accommodations. The Chamber of Commerce, this last week, called a special meeting at Norristown and that meeting passed resolutions inviting this body to meet there and made themselves responsible to meet the people as they come in on the different trains and see that they get proper accommodations. The hotel keepers promised that they would not put their rates up for the sake of getting money out of the members of the State Board; and further, there is only one Valley Forge in the United States.

The members of this Board, no doubt, have all heard of Valley Forge, but it is a question in my mind whether half of the members have ever been there. Valley Forge is worth visiting, worth paying a special visit from any part of this State, but what the Chamber of Commerce promised the other night is this, that if this Board sees fit to come to Norristown, we will give the members and their friends a free automobile ride to Valley Forge, through that historic place, showing the beauties of it. Since the National Government took hold of it, many of you people wouldn't know it today, and I think it is well worth while visiting. Therefore, I believe that if you decide to come to Norristown, you will be better satisfied than if you go to Stroudsburg. I have nothing against Stroudsburg at all, but I believe that what you want to do is to take in that trip to Valley Forge; and as far as the farming community is concerned, Montgomery county don't need to take a back seat with any county, I believe. We have a good agricultural section right around Norristown, and I want to invite you to come to Norristown and I hope that when it comes to a vote, the majority will vote for that place.

MR. WELD: A good many of you have come up to northwestern Pennsylvania during the winter, and you have put on extra coats and tried to keep warm. Warren, the county seat of Warren county, invites you to come up and hold your June meeting in our beautiful agricultural section beyond the Alleghenies. We can furnish you good accommodations, good railroad facilities for getting there; the Erie Railroad runs through New York State, to be sure, but it follows the northern line of Pennsylvania the whole length of our State and will land you in Jamestown and you can drop down to Warren by an excellent trolley system. The Pennsylvania Railroad runs right through Warren, so it is quite accessible, so far as railroads are concerned. It is a beautiful section, as you will find if you come there in the summer time. It is on the Allegheny River, and you have never been nearer western Pennsylvania than Lock Haven or Newcastle, and if you don't come to Warren this year, we do want you in the near future to come to northwestern Pennsylvania and encourage and help our farmers and stimulate them with the stimulus that comes from a meeting of the State Board of Agriculture.

MR. KILLAM: I know that country around Norristown; the farmers there are so thrifty that they need no incentive from this meeting. But in poor Monroe county and near Pike, they need all the assistance they can get. My great grandfather wintered at Norristown, at Valley Forge, in 1778, and I don't care anything about seeing it, never have seen it, and I was wondering if we should go to Norristown, whether we wouldn't be a little bit too near the great city of hobble skirts, Philadelphia, and I think the greatest benefit that can be derived by our people and the most pleasure that the State Board can get out of the trip is to go to Stroudsburg.

MR. JOEL A. HERR: I understand that Norristown and Warren each have an insane asylum, and we'd better not go there.

MR. SCHULTZ: I don't think the good brother would want us to infer, when we look around here at these bald heads, that they would be influenced by the hobble skirt; therefore, I make a motion that we come to Norristown.

Motion seconded.

MR. KILLAM: I beg your pardon, Mr. President, there are three places nominated and I believe the proper way is to call each man and each county and let the Secretary record where he votes to go. Isn't that the correct practice?

The CHAIRMAN: Yes, sir, the Assistant Secretary will call the roll and let each individual mention his preference when his name is called.

The roll was then called and resulted in the selection of Stroudsburg, which received 32 votes, as against 12 for Norristown and 2 for Warren.

On motion, the vote for Stroudsburg was made unanimous.

MR. BRONG: I want to thank the members of the Board for their action and we will try to prove to you that you will not regret your vote this day.

MR. SCHULTZ: I hope we won't hear the reports we heard from one of our Institute workers, who traveled through that county. He said they robbed the people. Mr. Brong said they wouldn't do it and we will take him at his word.

MR. BRONG: The Credentials Committee have a report they would like to make in the case of Mr. J. Aldus Herr. The Committee reports that it is their desire, and they do recommend the seating of Mr. Herr as a member of this Board, with instructions to Mr. Herr that he secure the proper credentials, or his credentials from the regular County Agricultural Society of Lancaster county, and that he file said credentials with the Secretary of the State Board of Agriculture at as early date as possible. There are two Societies down there, a farmers' organization and the regular County Agricultural Society. I might say there is no friction whatever in the Society, only the people of Lancaster county have been in the habit of sending Mr. Herr through the farmers' organization and the Agricultural Society has been neglecting to do anything along that line; but Mr. Herr says that he can easily secure the proper credentials from the regular County Agricultural Society. In the case of Mr. Edward Lienhard, of Carbon county, the Committee will say that Mr. Lienhard claims that he forwarded his credentials to the Secretary of the State Board and they must have miscarried in mail transportation, and it is the desire of the Committee that he will also secure the proper credentials and place them in the hands of the Secretary at as early a date as possible, and we recommend that he be seated subject to his filing of these credentials with the Secretary.

MR. JOEL A. HERR: At our last meeting at Washington, I believe it was, there was a Committee on Memorials appointed, consisting of Mr. Rodgers, Mr. Black and myself. There has come to my notice no death in the ranks of the Board's present or past membership, except that of William B. Powell, of Crawford county. Now, I want to ask the members of the Board present to notify us if there are any others that we don't know of who have passed away during the past year.

The CHAIRMAN: If there's any member present who knows of any other death, he will report it to the Committee. The next subject on the program is Sanitation, by Dr. W. Frank Beck, of Altoona.

SECRETARY CRITCHFIELD: Before we pass to the next item on the program—there wasn't anything done with the report of the Committee on Credentials, and I move the adoption of that report.

The motion was seconded and adopted.

The CHAIRMAN: We will now hear from Dr. Beck.

Dr. Beck's report is as follows:

## SANITATION AND HEALTH INSIDE THE HOUSE

By DR. W. FRANK BECK, *Altoona, Pa.*

When we look at the many great discoveries of recent years, none stand out brighter, none are more important to the human race than those of Sanitation and Medicine. I could mention such as Antitoxin preventative inoculation as perfected by Pasteur; transmission of diseases by insects, antitoxin for typhoid and the X-ray.

If the farm home is to be attractive it must be made healthy, for good health is more important that the best crop that can be raised.

### KITCHEN

If people want to enjoy good health, the kitchens should be properly cared for. More trouble can originate in an unsanitary kitchen than in any other place in this world. Many people who plan homes put all the thought on constructing a beautiful and convenient house and leave anything to answer for the kitchen. Much of the happiness and success of the home will depend on how the kitchen is kept and run. Many of the most important battles of life must be fought out in this room. In building the kitchen I believe in having everything wood, bare wooden shelves, bare wooden floors, etc. There should be no enclosed cupboards constructed in kitchens or anything else that cannot be effectually sterilized with boiling water. In sterilizing wood with boiling water, you should immediately follow it up with cold water. This prevents the wood from becoming soft and spongy. The dish cloth and tea towel should be used as little as possible. Instead of wiping dishes, they should be put in a rack, and the last process in washing dishes should be rinsing them with boiling water and leave them to dry. Dish cloths should not be used for lifting pots and pans. A thick pad should be made out of old cloths, and when they have served their purpose, they can be burned in the stove. While in use they can be sterilized in the oven with dry heat and used for a long time.

Cooking utensils should be made only of aluminum and plain old-fashioned iron. The chemical action of food has least effect on these than any other substance. Cheap granite and enamel ware should never be used in the kitchen. The sharp slivers scale off and are exceedingly dangerous when eaten with the food. It has been proven by some authorities that they have caused cancer of the stomach and appendicitis. This may answer the question as to why these diseases are increasing daily.

Paper napkins and paper tablecloths should be used more in the home than they are. Linen, which is easily soiled, is hardly ever kept in proper condition. Spots of grease on the napkins and tablescloths are a fertile field for the growth of bacteria.

## REFRIGERATORS

The refrigerator should be looked after much oftener than it is. In the past year I have inspected about one hundred refrigerators, and out of this number, I found not one kept in a proper sanitary condition. I venture to say that not one out of ten thousand in the Pennsylvania homes is perfectly sanitary, and it is dangerous to the health of that home. The refrigerator should be constructed so as to have a good circulation of pure air. If it has this, it matters little what materials it may be constructed of. After examining many refrigerators of all kinds, I prefer to recommend one that is lined with plain wood so that the inside construction can be easily removed and sterilized with boiling water. The proper refrigerator then would be one with a free circulation of air, one that is constructed of wood, and one that can be easily sterilized with boiling water. Many people have the idea that because it is the refrigerator, it needs no care and anything can be crowded into it so long as it is called a refrigerator. Ice boxes which are commonly used as dangerous in every way and their use discontinued. They have no circulation of air and are hard to keep in a proper condition.

If the ice becomes exhausted the warm, wet, soggy condition inside, means a fertile field for the growth of bacteria of all kinds. The care of a refrigerator should at all times be under the direct supervision of the head of the house and should not be left to those who look after it in a haphazard way.

## FLIES

I claim the honor to be among the first to have written anything against the common house fly or denouncing him as dangerous. Twenty some years ago, while delivering a lecture, entitled "Public Hygiene" at the Court House in Mifflintown, Juniata county, at a teachers' institute, one of the things I said was: "The common house fly was the most dangerous living creature." Up to that time and for ten years later the fly was known as nature's scavanger. It is an absolute fact that common stable manure is a breeding place for flies. Last year I carried on an experiment in a stable. I found that where the manure was kept perfectly dry, the flies did not breed at all, but where the manure was kept wet, they bred with wonderful rapidity. It has been found that the flies' feet are wonderfully adapted to carrying Typhoid Bacteria, which partly accounts for the spreading of this dease during the warm months. If a fly, whose feet contained Typhoid Bacteria, would light on milk these would multiply so rapidly that within twenty-four hours there would be one million in a drop of milk. This goes to show that this bacteria will grow faster in milk than in any other field. Milk should be always kept from flies, whether it be in the stable, barn or kitchen. Unsanitary milk is always dangerous in every way.

## FRESH AIR

It was intended that we make use of plenty of fresh air, because there is more of this substance than any other. The farmer, as well as other people, has more fresh air and more cold water than most anything else, and it is a fact that they use less of these than they should. If we make use of these properly it will prevent many diseases that affect the human family. If people wish to have good health, they must open up their houses to air and sunshine. All curtains, carpets, pictures, and unnecessary furniture should not be used in the home. It has only been in the last few years that the people took proper notice of ventilation in their homes.

In making a thorough study of this question in the last few years, I find that in the western part of our State, where soft coal is largely used, places that are considered smoky cities, the homes are best ventilated and they make use of more fresh air in their bedrooms. In the eastern part of the State, places where they burn hard coal they do not seem to have the same regard for ventilation, either in hotels or private homes. The people who live in the farm house will never enjoy good health until they let more air into their bedrooms. Those that are sleeping in closed bedrooms should begin immediately by raising all the windows in the bedrooms one inch each night until every available space that will admit air is thrown wide open. I absolutely know for a fact, under many trials, that people who have had poor health all their lives have been restored to perfect health by following this simple and easy method.

Pneumonia is a germ disease caused by a living organism. It is contagious and prevails largely in the winter months, at a time when people commence to close their bedrooms. This germ flourishes most in a cold bedroom with poor ventilation. Adinoids, which is a common disease now among the young people, is caused largely by sleeping in rooms that are poorly ventilated. It is said that this disease can be cured without an operation by sleeping in the open air, for a period of six months. Another effective way of making proper ventilation is to leave the window screens in all winter. By tacking cheese cloth over the screen, it will prevent all unnecesary drafts, at the same time admitting the free circulation of oxygen into the room.

### BATHING

One of the most important questions confronting the people who have homes in the country where there are no proper conveniences, is the question of bathing. I have always advocated the use of cold water, especially to country people, not because it is more convenient, but it is healthier. The Greeks have taught us this question centuries before our country civilization existed. There is no question that if our country people would take cold baths, sleep in properly ventilated bedrooms, they would all be in more perfect health. It is not necessary always to have a bathroom. Bathing can be effectually done with a large sponge. This should always be followed by a brisk rubbing with a coarse towel. Men that work hard on a farm and in the fields, should never sleep with the same shirt. This is too frequently done in many places in our State. The body, through the day, throws out a great deal of impurities. These crystalize on the shirt in the form of salts. At night the body reabsorbs this poison. This may produce such common diseases as rheumatism, stiff joints and back, and many other diseases that bring on premature old age. This is often blamed on hard work, when, in reality, it is due to disregarding the laws of personal hygiene.

The CHAIRMAN: Gentlemen, you have heard this report; what is your will?

MR. HEILMAN: I would like to ask Dr. Beck whether he has ever tried the use of acid phosphate in preventing the breeding of flies in the stable?

DR. BECK: No, sir, I never tried that, but no doubt it would work.

MR. HEILMAN: Acid phosphate, I understand, is the only thing that will prevent it; the floats or land plaster will not prevent the breeding of flies, but acid phosphate. If you use a ton and a half to every thousand pounds of animal manure, it will absolutely prevent the breeding of flies.

MR. COWAN: I have been trying that for several years around the stable but have not had any occasion to try it around the house. We don't know what a house fly is. If one makes an effort to come in the house, my wife either kills him or sends someone else to do it. But by using acid phosphate around the farm, there is not much danger of breeding flies.

It was moved and carried that Dr. Beck's report be accepted.

SECRETARY CRITCHFIELD: I would suggest that it would be in order to have the report of Dr. Dixon just following the excellent paper we have heard from Dr. Beck, and I know it would be entirely satisfactory to Prof. Kellogg.

The CHAIRMAN: If Dr. Dixon is present, we will hear his address now.

Dr. Dixon spoke as follows:

## THE WATERS OF PENNSYLVANIA

By DR. SAMUEL G. DIXON, *Commissioner of Health*

To-day I want to have an elementary heart-to-heart talk with you about water and the water courses of Pennsylvania.

We can live longer without food than we can without water. It makes up 66 per cent. of our bodies. In its purity as Nature causes it to fall from the atmosphere, it is the most healthful of all liquids and the only one which will satisfy the thirst. Without it our blood would not circulate through the vessels of our anatomy. The infant in embryo is fed by blood of which water is such an important part. It must be fed by blood which is clean and pure in all its parts in order to build up a healthy youngster.

Milk, upon which the baby depends for its existence after birth, is made up of 90 per cent. water. Milk is the most satisfying food known for man, yet I have just said 90 parts out of every 100 parts of it are water.

Water is used more than any known liquid. Today, however, we want only to consider it in connection with the health of man and with the health of animals and vegetables which are used directly as food for man. Water is used more largely than any other liquid for drinking. It is used for preparing food for the consumption of man and animals, for the washing of all the utensils used in the handling, storing and transporting of our food stuffs. It is used to irrigate the soil in which is grown the vegetables that we eat without cooking. It is a principal compotent of all nonalcoholic drinks and liquid medicines. It is a necessity in our homes, in cars for transportation of the public and in a thousand and one other places, and other ways.

With what little I have said about this great commodity which covers the greater part of the globe, you can realize the importance of Pennsylvania's efforts to keep her waters pure. When our General Assembly of the Session of 1905 passed the Purity of Waters' Act and placed the execution of the work upon the Department of Health, the work was organized by January 1, 1906. So by January 1, 1907, our statistics of 1906 gave us the number of deaths from typhoid fever alone to be 3,917. No other acute disease occasioned so many fatalities, with the exception of pneumonia. These figures meant, that out of 100,000 of our population, 56 people died that year from this water borne disease. In that year there must have been about 40,000 cases of typhoid fever in Pennsylvania, nearly all resulting from infected water or from milk which had largely become poisoned by polluted water finding its way into it in one way or another. I want you to try to imagine the suffering of the bodies and souls of our people from this great plague. Typhoid fever gave the doctors more work to do than any other disease, and almost as much as all other acute diseases put together.

Independent of the suffering and sorrow of our people, the loss by death and the loss of time of those afflicted was causing a loss to Pennsylvania in money value of fifteen millions of dollars a year, not including the money paid by the people for the services of doctors and nurses and for medicines and undertakers. Such a condition was a blot on the escutcheon of this Commonwealth. There was no excuse for us after God had blessed us with the riches of our mineral deposits and farm lands and with the greatest streams of pure water of any of the states in the Union. We were censurable. We would not have defiled our food stuffs or food prepared for others to eat, yet because these sparkling, beautiful, pure streams were continually flowing to the sea, we began to use them as carriers for our filth and refuse in order that it might be carried away from our homes. We did not seem to think of our neighbors down stream who depended upon the water for domestic purposes and that this same water might be used for drinking purposes both by man and beast after we had so thoughtlessly defiled it.

This condition of affairs went on until the "beautiful river" (Schuylkill) has become a stinking sewer. The great Delaware is fast growing into a gigantic conduit for carrying sewage, while many of our small streams throughout the State are badly polluted and are guilty of distributing much sickness along their shores. In fact, they have carried great epidemics into our municipalities, leaving death and sorrow in their wakes. It is impossible to understand why we have all so long tolerated this death dealing habit. If we have a half-dozen deaths a year in our State from pellagra, the people are excited and almost ready to stampede. A reported case of small pox in a community usually causes considerable alarm.

Typhoid fever is caused by a micro-organism discovered in 1880 by Eberth. He first found them in the spleen and glands of the intestines and liver and kidneys from which they follow the natural discharges of the body. These little vegetable organisms are about 1/125,000 of an inch long. When they get from the intestinal tract or kidneys of a patient into our streams, I know from experience that they may travel fifty miles or more and produce fearful epidemics of typhoid fever in towns even that far down stream from their place of entry.

In Nanticoke we had an epidemic of about 445 cases with about 44 deaths. All this came from one case along the water shed about one-eighth of a mile from the stream from which water was taken to supply the borough. On the premises where this case occurred there was a small surface outhouse and a heavy rain washed some of the contents of this surface closet into the stream from which the water company was taking the supply for Nanticoke. As soon as we discovered the cause of this epidemic, the little outhouse was removed and the place disinfected all the way to the stream. The reservoir and the water pipes were all disinfected, and as soon as the incubation period passed, the new cases fell off until the epidemic disappeared, but it was too late so far as the hundreds of cases already infected were concerned. The Department of Health notified the people of Berwick and Nescopeck at once, forty miles down stream from Nanticoke, using water from the river upon which Nanticoke is situated, that they should boil all their water. The people were indifferent to the Department's notice with the result that both of these towns had epidemics of typhoid about the time that I predicted such results if precautions were not observed. Our Department at that time was young and we have not yet educated the people. Now we find that the citizens of the State have learned to have confidence in us and are co-operating in our efforts to stamp out this deadly disease.

Anthrax is another disease which is carried by water. It prevails extensively in sheep and cattle in various parts of the world. It also occurs in man and is very deadly. This disease is also caused by a vegetable organism discovered by Daraine, a French physician, in 1850. It is about 1/2000 of an inch in length and is communicated to those who handle hides or wool. Pasture lands become infected with this organism and remain so for years. From these pastures, from slaughter houses, tanneries and places where dead animals are kept, streams are infected.

Tuberculosis is also produced by a vegetable organism which averages about 1/125,000 of an inch in length. This disease is widespread over the face of the earth and is killing thousands of the good people of this Commonwealth every year. These organisms also find their way into streams, both large and small, and in some waters may live for quite a while.

Not only do these death dealing germs I have been talking about get into the streams but they also find their way into the springs and wells from which water is used for drinking and washing our milk vesels. Unfortunate it is for all of us, and particularly those of us who are entrusted with the health of the eight millions of people in this State, that millions of these organisms may be present in a tumblerful of clear, sparkling water without our being able to see or taste them. Our natural instincts fail to give us warning though the tumbler may be as death dealing as the hemlock draught. Too many of our lay people may be likened to the Indians who said, "No see 'em, no believe 'em." If a foreign enemy landed on our shores and made an attack upon our lives it would not require much energy to arouse our people to arm themselves and go forth to battle with the invaders, yet I can assure you that it is often discouraging to the health officer, after he has almost exhausted his strength and his patience trying to convince the people that disease organisms are finding more victims every year than were found on the battlefields of the Civil War, to still find the public indifferent particularly when we know that many of the diseases can be overcome with the intelligent co-operation of the citizens of the State.

I have spoken of the necessity of keeping our waters pure for various reasons amongst them that impure water finds its way into milk, a delicate emulsion which nature intended should be fed from the mother to the offspring, without any exposure to air, water or anything that might introduce poisons or germs of disease. Civilized life, however, has broadened its use for food, and milk from animals, particularly from cows, has become one of the most valuable foods for man. Milk makes a good medium for disease germs to live in and multiply and therefore it must be handled with great care and intelligence.

FOOD EQUIVALENTS TO ONE QUART OF MILK
AT EIGHT CENTS PER QUART

| | Per cent. of proteids. | Per cent. of carbohydrates. | Per cent. of fats. | Caloric units. | Cost of quantity named. |
|---|---|---|---|---|---|
| Milk, | 3.3 | 5.0 | 4.0 | 654 | .08 |
| 1 lb. lean rcund of beef, | 20.9 | .......... | 10.6 | 626 | .17 |
| 8 eggs, | 13.4 | .......... | 10.5 | 676 | .27 |
| 2 lbs. potatoes, | 1.9 | 18.3 | 0.1 | 770 | .10 |
| 7 lbs. lettuce, | 4.2 | 6.3 | 0.6 | 1,491 | .50 |
| 4 lbs. cabbage, | 1.4 | 4.8 | 0.2 | 488 | .08 to .10 |
| 2 lbs. salt codfish, | 26.3 | .......... | 0.3 | 9.80 | .30 |
| 2 lbs. fresh codfish, | 11.6 | .......... | 3.5 | 708 | .46 |
| 2 lbs. chicken, | 21.9 | .......... | 8.9 | 1,890 | .50 |
| 5 lbs. turnips, | 0.9 | 5.9 | 0.1 | 600 | .15 |
| 1-6 lb. butter, | 1.0 | .......... | 85.0 | 537 | .08 |
| 1-3 lb. wheat flour, | 11.4 | 74.8 | 1.0 | 550 | .01 |
| 1-3 lb. cheese, | 25.9 | 2.4 | 33.7 | 650 | .10 |

You can see by this table that milk does not command as high a price in the market in proportion to its food values as do other food stuffs. This apparent lack of proportion calls for an explanation and may be accounted for by the unstable and highly susceptible nature of the product. Milk is a liquid which is susceptible to thermal conditions. Under summer heat in this latitude it soon sours and looses its food value, and as I have already said, it is a good culture medium for germs of disease. If it becomes contaminated with typhoid germs from infected water or from dirty hands of persons coming in contact with or nursing those suffering from typhoid fever or from flies coming from an outhouse where non-disinfected dejecta has been deposited, it will carry the germs of typhoid fever along the milk route and will spread an epidemic of the disease. If scarlet fever, smallpox or any other communicable disease happens to be in the home with those handling the milk, those diseases may also be carried. If the milk is kept in dirty vessels or the dirt from cattle not properly cared for gets into it, chemical substances are produced which are extremely poisonous. Consumers therefore have become afraid of milk and try to find substitutes to take its place. Demand has a close relationship to the price an article will bring in the market. From what I have said it must be evident to the dairy farmer that if he will study all things that tend to depreciate the value of milk, it is largely in his own power to raise or lower its market value. Keep the streams, wells and springs clean, keep the cattle clean, keep them in clean, well ventilated barns, give them outdoor exercise that their bodies may be free from disease, cleanse your milk utensils thoroughly, keep healthy helpers, keep disease away from your home or if it does come keep the milk away from the disease and every one who comes in contact with it. Disinfect all vessels you collect from your customers, or, better, use destructible milk containers when you can get them at a low enough price. If you can convince the people that milk has been robbed of its dangers, the demand will become greater and you will receive more nearly its true food value. Pure water will help in bringing about this result. Raw milk is the most easily digested, but to be used raw, it must be pure.

What I have said about the relationship between pure water and the value of pure milk brings me back to the streams, to their past dirty condition and to their relationship to the farmer. The intestinal and kidney discharges can be kept out of the streams at a profit and at the same time thousands of cases of sickness and death from typhoid fever can be prevented. One day last week when I was trying, with many interruptions, to jot down some notes for this talk, I received the following letter:—

Dr. Samuel G. Dixon,
Commissioner of Health,
Harrisburg, Pa.

"Dear Mr. Dixon:—It pleases me much to learn that you are to make an address before the State Board of Agriculture, January 28th, on 'The Waters of Pennsylvania.'

"Last summer when I was up in Centre county, I heard of a case in which your Department had insisted on a farmer constructing a concrete base and sides to his barnyard manure pit. The tale the farmer tells is this:—'The State Board of Health fellows came up here and they made me fix things up, so that the drainage from the manure should not get into the stream. Well, I kicked like a steer but they made me do it. Now, do your know, that ever since I have been kicking myself because I did not do it long before, because the increased value of the manure has paid for the whole thing many times and to think I have been letting that stuff go to waste makes me mad.'

"Again, on the 10th of this month, I attended a meeting of the Schuylkill County Agricultural and Horticultural Society. One of the old farmers complained of the exactions of the Health Department. He said an official of your Department had visited his farm and gave him but thirty (30) days in which to do the work, i. e. preventing drainage from his barnyard from flowing into the stream. I told him he should have done it long before he was required to by the State.

"Dr. Van Slyke of New York, one of the foremost authorities on Fertilizers, etc., makes this statement in his recently issued work on the subject, 'The values of the loss to the farmer of the United

States through the waste of this liquid is $70,000,000 annually, a sum equal to the value of some entire crops.'

"I hope you will handle this matter without gloves. Some of the farms I have visited are positively unsanitary."

This brings me to the value of the natural fertilizers which mean so much to the success of the farmer. By permitting them to be washed into the streams they are carried away, never to return to the soil from which they originally came, yet when they are carried into some public water supply, they may be returned to produce epidemics of typhoid fever where farmers serving milk may carry the germs of the disease back to the dairies in the milk bottles collected from their customers.

The manure from horses, cattle, sheep and hogs is rich in nitrogen and some phosphoric acid and potash, differing somewhat in proportion with the varieties of animals mentioned. Its value in dollars and cents varies, depending upon the way in which the animals are fed and upon the geographical situation of the farm. Near our large markets it brings good prices. What I want to impress upon you, however, is that the liquid which so often is permitted to run off into the streams, is generally worth at least three times as much as the dry manure, and if you permit the rains to dissolve out the nitrogen and carry it away, you will often find the drainage from your barnyard worth five times as much as what you have left to haul out on your fields. If a farmer is unable to haul the manure out every day or so, he can well afford the labor necessary to retain this valuable liquid. Such work will bring an immediate result and save money that would otherwise go for artificial fertilizers.

If you do not retain the natural liquids and those dissolved out by the rains, your crops will fall short or you will have to take the cold cash and purchase artificial fertilizers which do not take the place of good, well kept manure. You will not get the humus nor will you keep up the biological standard and general physical conditions of your soil. If you will keep the manure in water tight pits, well packed and moist, your expenses will come back to you tenfold and at the same time you will be your brother's keeper by preventing your sewage from getting into his water supply and making him sick with maybe one or another of many intestinal diseases. You can co-operate with the health authorities, make more out of your land and save others and yourselves much sickness, sorrow, yes, death.

Now I will show you a few pollutions of streams. This picture shows the spring on a mountainside in a non-inhabited water shed valley. That spring was found perfectly pure; it is considered one of the head waters of the State. That picture shows the water from this stream and others rushing down the side of the mountains still pure. This is pollution finding its way into the stream that nature had given us, so pure, so beneficial, so harmless, now becoming dangerous. Along a little tributary of the larger stream, here is another outhouse with its contents going directly into the stream. Now the only thing necessary there to bring about an epidemic of typhoid is to have a typhoid case discharged into the stream and have it carried down to some water intake. That is just a repitition of the same thing—put directly over a stream. There this whole stream passes under an industry; the waste of the industry passes into the stream. Here is another example of the same thing, an industry passing its waste into this little stream and another outhouse built here. This is one outhouse where, in dry weather, it is comparatively harmless, but when it rains on this hill and the amount of surface water is great, it finds its way over this hill into a stream and causes an epidemic. Here is another stream quite pure until it gets to this point, until a privy is put here and the contents finds its way into this little stream. Here is a spring house such as is often put at the foot of hills. Up here is the outhouse and when it rains the contents of this outhouse will be found working itself downhill into this springhouse. Not only was that water used at times for drinking purposes at this one place, but it was also used to wash the milk cans. This is another example of the same kind. The privy was back here and the contents found its way down grade here into this spring house. This is one of the causes of great epidemics, we removed the outhouse and caused the place to be disinfected. That is the same thing, showing where it finds its way into the stream. This is a continuation of the same stream, showing how it spreads out and makes a filthy swamp, a great breeding place for mosquitoes, independent of being infected, and through which the cattle wade and get their teats infected. That had something to do with one of our largest epidemics of typhoid. It was one of the contributory causes. Down here was an outhouse. Water washed over here and came down over this wall. The clothes from the typhoid patients were washed in one of these buildings here and then that water went down the side gutter of this road into a stream just above a water intake. That is a dangerous stream winding its way along the side of the road, through a barnyard, subject to pollutions from tramps, etc., going along this road. That stream finds its way into a meadow, always a good place for the wading of cattle. That is the same thing, and cattle here are found in the summer time wading in the stream, which is very badly polluted. Here is where a barnyard has this water around it, and this farmer has objected to saving the liquid manure and has knocked a hole in the wall for it to discharge into this stream. This is a picture showing pig pens back here and the contents of the barnyard, etc. are all washed into this stream; that caused an epidemic. Here is a good example of railroad pollution; here is an open trestle work over which passenger trains are passing frequently, and they are as apt to have the toilet rooms used in going over this little stream as at any other point on the road, and typhoid passengers are travelling in the early stages of typhoid to get home and deposit the contents of the closet in the stream. That was the cause of the great epidemic at Scranton. This is a common habit, throwing animals into streams used for drinking purposes. Here is a place where this industry empties all its toilet rooms directly into the stream. When the water was high, the fecal matter dropped directly into the stream and at other times washed in, and caused an epidemic. Here is a barnyard and outhouses emptying directly into the stream. This is coming to a town and here are overhanging privies, as used to be the case all through the Commonwealth, polluting the streams. One of these streams that you have been following comes down a considerable distance above here and here is the water works taking the water from the stream that is polluted, as I have just demonstrated to you. You can see how the great blessing that we had in this State, one of the most richly watered states in the Union, has become a curse to us through our own filthy habits, and I do hope that you will go away from here and be missionaries to try and help us to get these pollutions out of our streams as rapidly as we can. We have already cut typhoid fever down sixty-seven per cent. in the State, and there is no reason why it should not almost be wiped out. Thank you very much.

The CHAIRMAN: This report will be filed. We will next have the report of Prof. Kellogg.

The report is as follows:

## REPORT OF MICROSCOPIST AND HYGIENIST

By PROF. JAMES W. KELLOGG

The report submitted at the last meeting of the State Board of Agriculture showed, in a brief manner, the method employed in examining various foods or feeding materials by the aid of the microscope. The work accomplished during the past year, as consulting Specialist for the Board, has been devoted for the most part to the examination of the samples which have been sent to the laboratory for foreign substances or materials which might not have value for feeding purposes. We have been keeping a "microscopic eye" on these products in order to separate the good from the bad and thus keep our markets free from feeds which are worthless or which might contain harmful materials or have little nourishment.

A number of samples of feeding stuffs have been examined where it was thought that illness or death of livestock had resulted from feeding these feeds. In nearly every case nothing could be detected, or any mineral poisons found, which would cause illness or death. One sample, however, was in a badly decomposed and mouldy condition, and the feed represented by this sample did, no doubt, cause the death of several horses, as claimed. This feed was absolutely unfit for feeding purposes and the parties interested were so advised. Feeds which are in any way damaged by dampness caused by improper housing, or which are at all mouldy or decomposed, should, not, under any circumstances, be fed to horses and mules. We are advised that these animals are susceptible to illness and death, if perchance they should eat such feed and were not prevented from eating the same by their own instinct. It would not be safe either to feed such products to dairy cows.

It is more often true that many cases of reported sickness or death of livestock is due to improper feeding rather than to the feed itself which is suspected of causing the trouble. In several such cases which we have investigated, and where nothing harmful could be found in the feed used, it was discovered that the ration was improperly balanced or not enough roughage was used. Postmortem examinations have shown that impaction had taken place in these cases referred to, thus causing the death of the animals, which was directly due to not enough roughage or lightening material being used. In one case where a particularly dry stock feed had been fed, impaction had taken place, where if the proper amount of water had been given, trouble, no doubt, would have been avoided. Some of these problems are rather those for a veterinarian to decide upon, however, these cases are brought to your attention at this time as your Specialist has been called upon to examine the suspected feeds. Care should be used in feeding concentrated mixtures and dry feeds, and enough green fodder or roughage and water should be used and the ration properly balanced.

If illness or death of any of your livestock occurs, a competent veterinarian should at once be consulted. Sometimes an experienced stock feeder can give advice, if all the information is at hand. If the trouble, after investigation, is laid to the door of any feeding stuffs, mixed feed or ration, the matter should be at once reported and we will be glad to make an examination of the suspected products. Arrangements have been made with the State Livestock Sanitary Board, in cases where illness or death is believed to have resulted from a certain feed, whereby an actual feeding test can be made in an attempt to locate the cause of the trouble. In such feeding tests it will be necessary to furnish the Department with enough of the feed, or ration, used to feed an animal two or three days. The feed will be sent to the Veterinary Hospital in Philadelphia and tried out upon some animal which is kept for this purpose and the results reported as soon as possible. We are ready at all times and glad to co-operate in investigating problems of this nature with which many members of this Board are confronted.

The Department has recently inaugurated a new line of work which it seems proper to call to your attention. At the last session of the Legislature a Pure Seed Law was enacted which became operative the first of the year. This law regulates the sale and sets the standards of purity for twenty-one kinds of seeds. It provides, in addition to obtaining official samples, for the testing for purity of samples sent to the laboratory by any one residing in the State. The fee charged is twenty-five cents per sample and the amount of each sample sent in should be from two to four ounces.

In order to carry out the provisions of the Seed Law, we have, therefore, fully equipped our laboratory with the necessary apparatus and are now engaged in the testing for purity of all samples which are received. Our Assistant, Mr. Howard E. Gensler, has been delegated as Seed Analyst, and we feel is in a position to carry out the tests in a thorough manner. He spent several weeks in the Seed Laboratory in the U. S. Department of Agriculture, at Washington, studying their methods. We trust you gentlemen will avail yourselves of this opportunity to have samples of seeds tested whenever any doubt arises as to the standards of purity being reached as set forth in the law. It is felt that this law will be of great benefit to all those purchasing and using the various kinds of seeds. No provision has been made for the testing of seeds for germination, and while this information is of real value, it is recognized by those conversant with this line of work that an attempt to inaugurate germination standards at the time of the passage of this Act would not be justified, for the reason that not enough work has been done in making germination tests to establish any standards.

In order that the information may be available and included in this report, the standards of purity for the different kinds of seeds named in the Act are presented herewith, as follows:

### STANDARD OF 97% PURE

Medium Red Clover, Mammoth Red Clover, Crimson Clover, Alfalfa, Timothy Grass, Barley, Spelt, Wheat, Buckwheat, Oats, Rye.

### STANDARD OF 95% PURE

Perennial Rye Grass, Alsike Clover, German Millet, Hungarian Millet.

### STANDARD OF 90% PURE

White Clover.

### STANDARD OF 85% PURE

Red Top Grass (solid or hulled).

### STANDARD OF 75% PURE

Canadian Blue Grass, Orchard Grass, Kentucky Blue Grass, Red Top (unhulled).

The CHAIRMAN: You have heard the report; what is the will of the Board?

Motion was adopted that the report be accepted and filed.

The CHAIRMAN: We will next have the report of the Committee on Fruit culture, by Mr. A. I. Weidner.

This report is as follows:

## REPORT OF STANDING COMMITTEE ON FRUIT AND FRUIT CULTURE

By A. I. WEIDNER, *Arendtsville, Pa.*

As Chairman of your Committee on Fruit and Fruit Culture, I submit the following: The past year has been one that will be placed on record, especially in the eastern part of Pennsylvania, as a bright spot in the history of the fruit grower of this section. Ever since the appearance of the San Jose scale louse, the orchardist has had a difficult task on hand both in labor and expense to hold it in check, and with all the effort that was put forth the loss was great in injury to trees and damage to fruit. During the early part of the season of 1913, fruit growers were keeping a lookout for the scale louse but none appeared, and then they began to consult with one another to know what had gone with the enemy. Some of the growers concluded that the late cold weather that came after trees were out in leaf froze the young that were moving and had not fixed for their permanent home; the parent scale was also supposed to be injured at a time when it was not prepared for the late freeze. Later on it was discovered that a number of different parasites that had been working for several years on the scale were more numerous than usual, and it is now generally thought that these held the enemy in check during the summer. While there was no apparent injury to trees or fruit the past season, it is a fact that there are enough scale left to cause a re-infection of this section. While the crop was being harvested in many orchards a few specimens were found on a few of the apples, indicating that there was seed enough remaining that it will be necessary for the grower to continue to spray for the scale louse. While it may seem not worth while to spray for the few scale it is well known that the same spraying will also destroy fungus if the lime sulphur preparation is used and it is therefore desirable to continue the spraying.

The apple crop, in the Adams county fruit belt especially, has been very satisfactory. While some of the orchards were injured at time of bloom and a little later when the May freeze came, yet the more favorably located orchards produced a good crop, and where properly sprayed fine and perfect fruit was harvested. The yield being greater this year on account of the many young orchards coming into bearing and the higher prices being paid makes this the banner year in the history of Adams county's fruit production. During past several years thousands of trees have been planted in Adams county alone. This year's fine crop and good prices have caused many of the growers to further extend their planting. Much fruit land has exchanged hands, and extensive planting will be continued in the Spring. The data for 1913 has not been fully ascertained, but will be about the same as that of 1911, which was 177,595 barrels, or 1184 carloads shipped from Adams county. The average price the past season was about three dollars per barrel. Elsewhere in the State the apple crop was not so large.

Peaches are not grown so extensively in Pennsylvania as apples. But where orchards are on elevated ground with good air drainage and with good culture and well sprayed they produced a reasonable good crop which brought good prices in the markets this year, and when properly grown and graded will always find buyers that are willing to pay a good price for them. Cherries were not a full crop owing to cold weather at blooming time and a little later some of the more hardy varieties produced about one half crop and brought good prices. Many growers who have soil and conditions that are favorable to the growing of the cherry are planting more heavily and will endeavor to supply the increasing demand. This, no doubt, will be a profitable venture. Quince crop was good and more perfect in specimens than usual and also sold well. Strawberries were not plentiful. Unfavorable weather at blossoming season injured many of the blossoms so they did not mature. Where beds were protected and sheltered, fairly good crops were produced and sold readily. Raspberries and blackberries were a shy crop, the demand being greater than the supply.

In conclusion, it has been admitted that as fine Pome fruit can be grown in Pennsylvania and of better flavor than that grown in the western part of the United States. In view of these facts and our nearness to the best markets in the world, Pennsylvania has a bright prospect for the future in fruit culture.

The CHAIRMAN: Gentlemen, you have heard the report; what is to be done with it?

It was moved and carried that the report be received and filed.

The CHAIRMAN: We will next have the report on Dairy and Dairy Products, by Mr. W. E. Perham.

The following report was read:

## REPORT OF COMMITTEE ON DAIRY AND DAIRY PRODUCTS

By W. E. PERHAM, *Varden, Pa.*

The past few years have seen a great change in the dairy business of this State—that is, instead of producing butter and cheese, we furnish now much more largely whole milk for city consumption. In some counties nearly all the creameries have become milk shipping stations. On the farm, instead of the raising of pigs and young cattle, you find only cows. The high price of veal calves tempts many farmers to sell so they grow not enough young cattle to keep up their own herds. Of the 20,000,000 cows in the United States, Pennsylvania claims over 1,000,000 of them. While statistics do not show as many cows in the country now as there were five or six years ago, their value has increased fully 30 per cent. The increased value of our dairy cows and the high cost of feed and of labor bring home to the farmer the necessity of getting rid of his unprofitable cows and keeping only those which return him a profit. He must do this or step down and out of the dairy business. The dairy farmers are waking up to this need, and are encouraged to keep accurate records of their cows. As a result of this, the breeding of herds steadily improves, better feeding methods are adopted, and the production of the cows are increased, and larger profits obtained.

Our Department of Agriculture is doing good work in assisting in the organization of cow testing associations. There are now several hundred of these associations in the United States, but I am sorry to say that Pennsylvania as yet, can boast of but few of them. If Denmark could double her dairy products in a few years as a result of her cow testing associations, certainly we can do as well if we go about it in as thorough a manner as did the Danes. While dairying is looked upon as drudgery by many, it is, nevertheless, the surest of any line a farmer can take up. His corn or potatoes, or his wheat may fail him, but his dairy rarely fails, and he can pretty surely figure out a year ahead about what his returns from his dairy will be.

Another cause of the reliability of dairying is the efficiency of the dairy cow in converting the crops of the field into a concentrated merchantable form. The past 15 or 20 years have seen great change in the mode of dairying and in the price of dairy products. I have seen milk delivered through the flush of the season at the shipping state for the New York market at 1¼c per quart, while last season from the same station and to the same market it did not get below 3c a quart, delivered at the railroad. Still we hear more about the dairy not paying than we did back when the prices were only about one-half what they are at present. 1913 was a banner year for prices on butter and cheese. The average price of fancy creamery butter for the year was 32.28c per pound, an increase of nearly ¾c over 1912 and 4⅓c over 1911. Milk in many places did not go below 3c at the railroad station. Many of the New York milk dealers take the Bordens as their standard for prices. Their price for this month, January, is 1.75 per 100 lbs. at the shipping station for C grade milk testing less than ⅜ per cent. fat. For B grade they got 10c per 100 more, and if it tests ⅜ or better, an additional 10c is added, and in addition to this they have been giving a bonus of 11c per 100 making a total of $2.06 per 100 for the farmer who is furnishing a good grade of milk. The butter market the past season has been unusual in one respect. Extras being quoted several cents above firsts. In former years these quotations run from ¼c to 1c apart, but this season they have been running from 2c to 4c apart, showing a great scarcity of extras, and keeping down the price of common goods to a point where the storage men are likely to loose on storage butter, although its quality may rank as firsts. This is a point our butter makers should note. Often a difference of two or three points in the scoring making fully that much difference in cents per pound.

There is no question but that with the increase in the price of dairy products has come an increase in the cost of feeding, but we are fortunate that the latter has not come without the former. Hoard's Dairyman says, it requires about 750 pounds of digestible nutrients to produce 1,000 pounds of milk. Calculating the amount of milk than can be produced from this basis and ignoring the adaptability of the feeds to produce milk, it will be found that an acre of timothy will grow enough material to produce 1,920 pounds of milk; an acre of corn, 4,600 pounds; an acre of oats, 1,500 pounds, and an acre of alfalfa, 5,300 pounds. While the prices of feed soar, the silo comes in as a great saver of money to the farmer. It is looked upon as a necessity and many new ones are going up each year. With all, the dairy business is a great business, and when it is managed on a business like basis, it will return a good profit, and the dairy outlook never was brighter than it is at the present time.

The CHAIRMAN: Gentlemen, you have heard the report; what is the will of the Board?

It was moved and carried that the report be adopted and filed.

The CHAIRMAN: Next is an address on "Work Done by the Dairy and Food Bureau since 1907," by Hon. James Foust, Dairy and Food Commissioner.

SECRETARY CRITCHFIELD: Mr. Chairman, Mr. Foust is engaged in cases that are now being tried in the Dauphin County Court and that will explain the reason why he is not here. I understand that Dr. Kalbfus, Secretary of the Game Commission, is here, and if he is in the house, we would be glad to hear from him.

**Dr. Kalbfus then delivered the following address:**

# VALUE OF BIRD PROTECTION

By DR. JOSEPH KALBFUS, *Secretary Game Commission*

Mr. Chairman, Ladies and Gentlemen: I did not expect to talk until Friday, but I am glad of this opportunity because I have another engagement. The subject is one dear to my heart and one that, to my mind, means more to everyone here present than do horses or cows, or sheep, or swine, or fruit, or fertilizer, or many another thing to which far greater attention has been given up to this hour.

I do not propose to waste time in an introductory except to say that Primeval man lived by the chase alone and was undoubtedly a savage, and that when man began to cultivate the soil, the first step along the road to civilization was taken. The successful cultivation of the soil is not only the foundation upon which the welfare of this nation is built, but is also the key, binding the people of each nation and the world together in their every effort, and as it has been in the past, as it is today, so it must be until men shall be no more. Those methods through which the greatest return can be secured to labor expended upon the farm, are the methods today, for our consideration, each method being an additional step toward higher civilization, and I take it that anything that tends to increase the yield of the soil, is well worthy of consideration. In the limited time given me in which to address you, it will be impossible to consider my subject in any but a casual way. The field is so great, that I might talk for hours, and then only "touch the high places." Still, I hope that I may say something that will cause someone here present to see the birds around them in a new light and to study more deeply the value of bird life, to him as an individual, to this State, and to this nation. I hope I may say something that will be remembered long after you shall have forgotten me, and that will lead you *to do something* for the birds, your best friends.

In the attempt to impress you I propose to limit my remarks to the saying of *startling things,* which things, no difference how impossible or unreal they may at first appear to you, are founded on truth, and mean something to every soul in this audience, and to those who may follow you through coming ages. No one will dispute the assertion that the tax levied upon the labor of the farmer through the ravages of insects is today one of the greatest claims he is compelled to meet, and the possibility of increase in this direction is beyond even the imagination of ordinary men. Those who have given this subject consideration from a scientific standpoint tell us, there are more than one million species of insects upon this earth, that the number of insect species is greater by far, than the number of species of all other living creatures combined, and the name of each species is legion, and while this is somewhat startling, what scientists say regarding the *possible* increase of species and the *actual* increase of the number of each species and the *capacity* of each individual to destroy vegetation is simply appalling.

In the consideration of possibilities in this direction I shall touch upon the high places, leaving you the intervening lands to explore at your leisure. Professor Surface tells me this world, in his opinion, would not be inhabitable by men in a very few years if insect life was not curbed in some way. He understands the possible danger and is working day and night to help stay the march of those untold myriads whose only purpose is to destroy, and whose success mean desolation to this fair land, famine, pestilence and death. Prof. Forbush, Ornithologist of the State Board of Agriculture of Massachusetts, in a work recently published, among other things says:

> "Many caterpillars daily eat twice their weight of leaves, which is as if an ox were to devour every 24 hours three-fourths of a ton of grass." He says, "a certain *flesh-eating* larvae will consume in 24 hours, 200 times its original weight, a parallel with which in the human race would be, an infant consuming, in the first day of its existence, 1,500 pounds of food." He tells us "There are *vegetable feeders*, caterpillars, which during their progress to maturity within 30 days, increase in size 10,000 times. To equal this remarkable growth a man at maturity would weigh 40 tons."

He tells us that Dr. Lintmer, late State Entomologist of New York, saw aphids upon a small cherry tree, which was only one tree in a row of trees in an orchard containing many rows. He counted the lice on certain of the leaves of this tree, counted the leaves of certain branches, and the number of branches on the tree, and estimated that there were at least twelve million (12,000,000) plant lice in that one tree, and to give an idea of what they meant said, "that to count this number, a man speaking as rapidly as possible, and putting in ten hours a day, would require eleven months to complete the enumeration." Think of the number of aphids in that orchard. Regarding the increase of insects in numbers he says, "It is possible for a single female potato bug, to be the ancestor of sixty million (60,000,000) of its kind in one season." Prof. Forbush, again quoting Dr. Lintmer regarding the possible increase of the hop vine aphid, says:

> "Prof. Riley discovered thirteen generations of this species in a single season, and, there being no losses, estimated it was possible for one pair of these insects, starting with 100 as the number of the first hatching, to be the ancestors of ten sextillion of their kind in the thirteenth generation."

This means 40,000 of these insects to every square foot of land that is above water in the world; it means that counting at the rate of two per second continuously it will take men and the children of men almost one hundred and sixty trillion years to count ten sextillion. Ten sextillion in figures is apparently beyond the ordinary comprehension of men, and Prof. Forbush uses time and distance to illustrate its vast meaning. He says:

> "If these insects were placed in single file ten to the inch, they would extend from the earth to the sun, a distance traveled by light in eight minutes—light is said

> to travel at the rate of 160,000 miles per second—and from there to the nearest fixed star, a distance traveled by light in six years, and from there on to the most distant star that is visible through the strongest telescope known to man, and from there still onward into unknown space, on and still onward, to a point from which it would require light 2,500 years to reach the earth."

That is somewhat startling, but there surely must be some fire where there is smoke. There must be some few insects in the United States, for it is estimated by the Agricultural Department at Washington, that through the ravages of insects, an annual loss to agriculture in the United States is incurred, equalling, if not exceeding, 10 per cent. of the entire production. Prof. Forbush estimates the loss from this cause in Massachusetts at 15 per cent. A loss of but 10 per cent. means a loss of more than one billion dollars ($1,000,000,000) to the farmers of the United States last year, and this loss is entirely outside of the cost of machinery, poisons, labor, etc., used in attempting to curb these pests, and is exclusive of the loss incurred because of rabbits, mice and other rodents. And what does this mean to us? It is claimed we have 600 colleges and universities in the United States, the value of which, including buildings, estimated at $260,000,000, and endowments, estimated at $219,000,000 is $479,000,000. The loss to agriculture in the United States through the ravages of insects in a single year would not only replace these buildings and their endowments were they from any cause destroyed, but would leave unexpended a balance of more than $500,000,000, an amount sufficient in itself to create and endow in like amount 600 new colleges and universities. It is estimated that we have 20,000,000 school children in the United States, and there is no doubt whatever but that the cost of educating these children is one of the heaviest demands made upon the reserve funds of this nation. The loss to agriculture through the ravages of insects in a single year would supply a fund sufficient to meet these demands for many years.

Our Representatives at Washington are spending much time in considering whether or not one battleship or two shall be built annually by the United States. The cost of building a battleship is about eight million dollars ($8,000,000), and the loss to agriculture because of insects in a single year would build annually one hundred battleships, and then some.

The greatest of all engineering feats in the history of civilization —the Panama Canal—costs about $400,000,000, and that we may fully understand the magnitude of this undertaking let me say, the excavation made in this work would mean a ditch 55 feet wide and 10 feet deep extending from New York to San Francisco. The dirt excavated, if piled in shape equal to the Chinese wall, would create an embankment 2,500 miles in length. The Chinese wall is about 1,500 miles long. The material excavated in this undertaking if placed in forms equal in every way to the pyramids of Egypt, would created sixty (60) such pyramids, that placed side by side, would extend more than 9 miles. The pyramids of Egypt, as you know, are three in number, and the work of their construction is considered to be one of the wonders of the world. The loss to agriculture annually from the ravages of insects in the United States, is more than double the cost of the stupendous work done in creating this canal.

I might mention the loss incurred through the Chicago fire, or the loss of life and dollars through the earthquake at San Francisco, or the tidal wave at Galveston, or the loss of the Titanic, each of which occurrences in itself, caused the great heart of the world to stand still in sympathetic fear, and brought into immediate action every energy of those in interest, to as quickly as possible remedy the harm done and to prevent, if possible, its recurrence. Only a year or so ago the farmers of this country, especially those residing in states along our northern boundary, were shocked, as never before, by the simple mention of possible harm that might come to them through a new political proposition known as "Reciprocity." Men abandoned the tenents of their fathers and severed lifelong political affiliations, because of what they feared might happen, under the proposed regulations. Yet no one of these occurrences singly, of all of them joined together, begin to measure either in the sacrifice of human life or financially with the possibilities of insect destruction and consequent famine.

Yet in the face of these possibilities, we sit with folded hands and do nothing; or worse, we ridicule and laugh at the one who does try to defend himself, through the use of improved methods. But, you are already asking how it is if what I have said to be partly true, that we can live upon this earth at all, and the the answer comes, because of disease, climatic changes, starvation, poisons, and the living enemies of insects, including birds, each of which wield a mighty influence in preventing undue insect increase and jointly bring the results we see, and the birds are a great factor in this direction.

Those who have paid special attention to the feeding of birds tell us that the great majority of young birds while in the nest are fed exclusively upon insects and that each young bird in the nest is capable of consuming daily an amount of animal food in the form of insects, equal to, if not exceeding, its own weight. This means but little when the food of one bird is considered, but in the aggregate means much. Say that we have but one nest of robins to the acre in Pennsylvania, each nest containing four birds, and each bird weighing but one ounce, only four ounces to the acre, yet it will at this rate require 3,600 tons of insects to feed the birds of Pennsylvania for one single day, for we have in this State in round numbers 28,800,000 acres, and this is entirely outside the quantity of insects consumed by the old birds during the same time. If you will only give consideration to their work and remember that they are put here, in the great majority of cases, to help you, I know you will be kind to them. I have issued an appeal lately and sent it broadcast, to feed the birds. They are working for you all summer, all spring and all fall, and now, when the world is covered with snow, they come to you for a little help. It is only a little thing. Any one of you perhaps waste every day in smoke more than enough to keep the birds in your community for weeks—many of you, I didn't say all. Won't you do it?

I was up to New York some time ago and heard of an old lady that had died and was about to be buried. Way in the background was one of the family servitors, an old lady who felt she was out of place in that gathering, perhaps, she was not of the religious persuasion of the dead, but somebody saw her and asked her if she wouldn't like to see the face of her departed friend before they closed the coffin. Walking forward with bowed head she stood at the bier, and there remembering the many kindnesess that came to her from that departed one, she stooped, and with her forefinger made the sign of the great Church to which she belonged on the forehead of that still, cold form, a sign that she had been taught from childhood was necessary to carry the soul of that departed one across the "valley of dark shadows." Nobody there she knew, perhaps, but she had the moral courage to voice her convictions in the face of all the people. I hope I may say something here that will lead you to appreciate the value of birds and cause you to do something for them wherever they may be and wherever you may be.

One of the greatest wrongs—there are a few ladies here but none of them have aigrettes on so I am going to talk straight. One of the greatest wrongs done to this nation and this world is in the murder of our birds for trade, for profit, and especially the millinery trade. The aigrettes that they wear, as they do, if they only knew where it came from and how it was taken, I am sure would not be worn. I have been brought in connection with those who are interested in this work, and I have seen the affidavits from those who saw the real facts, and every one of these plumes, to be of value, must be torn from the warm, quivering body of a freshly murdered bird, otherwise it is without value. The litle birds are left to starve in the nests. The old ones have started out for food in the morning, utterly oblivious to any danger in their surroundings, bang,—bang, some plume hunter has gotten in his work, and the little ones are waiting for food.

Gentlemen and ladies, think of your own little ones at home. The rustle of a leaf, the breaking of a twig, causes the babies in the nest to rise in expectancy, only to settle back in disappointment, for the wings were those of a stranger to them. Think of your own little ones and have the moral courage, when you see these things, to say that the aigrette plume is a bloody badge of crime and nothing else and that it means nothing else to you.

We hardly realize what the birds are doing. We have in this State some 345 different varieties of birds, 18 families and these families, wherever they are, are doing something for you that you cannot do for yourself and perhaps do not know the need of doing. I am going to simply use one illustration: A few years ago I had occasion to arrest a farmer right above town for killing twelve robins in his cabbage patch. Before the Alderman, he said: "I had a right to kill them, they were pulling up my cabbages just as they picked up red worms." I went up to this farm; I saw the robins among the plants. I got over the fence and crawled up and down the rows and examined them. There wasn't one single plant cut off above the ground; there wasn't a single root pulled out; but every one had been riddled below the ground line by the larvae of the click beetle, known as wire worms, and I took from two in one hill forty odd in a hill and with a handful I went to the attorney and said: "Now what?" "Why," he said, "Doctor, he did not understand." That's the trouble. If we all understood; if we would all do our part to have those around us understand, it would not be necessary to talk upon that subject anywhere. But you don't understand, the people don't realize that this robin, the very minute he comes here, the harbinger of spring, the very minute he comes is beginning a work to benefit you, and the minute he gets in your cherry tree or in your strawberry patch, you soak him. Think of it! If the laborer is worthy of his hire, that bird is worthy.

I met a gentleman down here, the orchard man, Dr. Funk. Dr. Funk told me he was down on the robins. He said: "They pull out all the red worms there are in the whole country." And we went on to talk and we drove into his orchard, and I said, "Doctor, there's a robin's nest over in that tree." He didn't say anything and we drove along further and we saw another; and finally another, and I said, "Doctor, there's another robin's nest." "Well," said he, "I like the durned things anyhow." (Laughter). He was protecting the birds and giving them every chance, although he thought they were doing him harm. If you would only do that. They are doing a work for you and doing it in a particular way, in a special place, a work that no other bird tries to do, because each bird has a specialty.

Take the flicker, for instance; the specialty of the flicker is destroying ants. The ant is the great protector of the plant louse, the aphid, which I have tried to figure out to you would overwhelm this earth in a very limited time unless it was curbed. The flicker is the destroyer of ants and the ant is the protector of plant lice; he carries the egg of the plant louse below the frost line in the winter time and brings the young louse out in the spring and carries it from plant to plant getting in return honey dew just as you keep cows for milk. The ant keeps the aphid for profit just as you keep cows for profit. The flicker destroys untold thousands of ants, yet the minute somebody gets a chance, he soaks him, and the excuse we make in Pennsylvania is, that if we don't kill them they go South and the niggers will do it.

It is a shame to try to excuse the wrong we do because somebody else does it. A gentleman, talking to me in the hall about the work of birds, spoke of a blackbird destroying the nest of an oriole, and he said the law was all wrong because while it gave protection from the hunter, it gives the farmer a right to kill a blackbird that is found destroying property of any kind, which he could not do under the old law. The blackbird destroying the nest of the oriole could have been killed legally under the existing law, but two years ago it could not have been done.

What is the oriole doing? They and the cuckoo are the great destroyers of the hairy catapillar, one of the most destructive insects against which we have to contend. Audubon said that a dissection of the stomach of an oriole would show that it was covered with hair. So it was; but it was not the growth of the stomach, it was the hair of the hairy catapillar. Those two birds are doing work for you that you cannot do. If you get a splinter in your hand, there's trouble unless you get it out. If you got a hair in your stomach, it causes trouble and it is so with any bird. A bird is created by God to do for you a work you cannot do for yourselves, and that means something to you everywhere, every day; it means something to every one of you and to every citizen of this Commonwealth.

Oh, I might go through the whole list of birds, but before I close I want to refer to hawks. We have 12 kinds of hawks in this State, 7 of which are protected because the are doing a work for you that the other birds do not do and could not do if they tried. I am going to give you one illustration: We had above Harrisburg here last summer a bird known as the red shoulder, the fellow that flies out here and hollers "Kee-yer—Kee-yer," and "there's a chicken hawk, get the gun out after him at once." I have an orchard, and going through that orchard last summer I saw on numbers of trees certain limbs which were almost covered with great big caterpillars. I looked at the tree and said, "I must clean that up tomorrow," and the next day I went down, and the droppings were there but the insects were gone. I dug around the roots to see if they had not crawled into some hole but couldn't find any, so I went after another tree and another, until finally I caught a pair of red shoulders in that tree with their four young ones; then I went to the books and found that they take pleasure in destroying caterpillars. So when you see a hawk, remember that there are only five varieties in the State that are injurious; some of them may kill a bird now and then or may occasionally take one of your chickens, but in the long run they do a work that is beneficial. And it is so with the owl. I saw a screech owl a few days ago that a farmer said had eaten a pigeon for him. This bird wasn't half as big as a pigeon. Examinations that have been made at Washington on the stomachs of 400 screech owls show that these birds live upon small rodents such as mice, and but seldom destroy birds of any kind. Still this gentleman cracked that owl over the head with a club and sold him for a quarter, leading me to believe that the quarter was what he was after rather than protection to his pigeons.

MR. HUTCHISON: How about the sparrow?

DR. KALBFUS: He is doing more harm than good. I want to say to you in this matter of feeding the birds, if you have ever been cold and hungry, you know what it means. I have been cold and been hungry. I happened to have been in the mountains of Colorado the winter after the Chicago fire, when the snow fell to the height of that lamp, and we hadn't anything to eat, and we cleaned up the bones we had picked for weeks before, cracked them and boiled them; took the skins off our cabin and boiled the water and drank it, and I don't know how I got out, but I know what starvation is, and when you go home, scatter a little grain, build a little house where the birds will use it, so that the blue bird, when he comes in the spring, has a place to go. You have cleaned everything out, cut down the old trees with the holes they used to occupy, so give them something new; it is only a little thing, and I beg you care for the birds and hope I have said something, in this limited time, that will lead you to do it, and I know you will all be better for having done it.

The CHAIRMAN: Gentlemen, you have heard this report; what is the will of the convention?

MR. HUTCHISON: I move that it be received and filed and published in the report.

Motion second and adopted.

SECRTARY CRITCHFIELD: This, Mr. Chairman, will mean that we will get the paper and the stenographer will combine that with the part that was taken extemporaneously. You know there was only a very small part of that discourse that was written.

The CHAIRMAN: That finishes up our program for today. A motion to adjourn, I suppose, is now in order.

Recess until 7.30 P. M.

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January 28, 1914, 7.30 P. M.

Vice-President George in the Chair.

The CHAIRMAN: First on the program this evening is the report of the Fertilizer Committee, through their Chairman, John H. Schultz.

Mr. Schultz submitted the following report:

## REPORT OF COMMITTEE ON FERTILIZER

By JOHN H. SCHULTZ, *Norristown, Pa.*

This subject of Commercial Fertilizer is an important one for several reasons. In the first place, we all know that it is very difficult to get competent farm help, and in consequence of this difficulty a great many farmers all over this great Commonwealth are changing their method of farming. Instead of having their stables filled with cattle and feeding the crops raised on the farm, they sell their cattle and dispose of their crops in the nearby market. The result of this method is a depletion of the fertility of the soil unless the farmer resorts to a more liberal use of commercial fertilizer. We find that this is what the farmer is doing because the sales of commercial fertilizer are increasing about 10 per cent. from year to year.

We also know that the successful farmer who feeds his crop on the farm and returns the manure into the soil, is using more commercial fertilizer today than he did five years ago. For we live in an age of sharp competition and the farmer who makes a success of his occupation must raise maximum crops and this can only be done by the intelligent use of commercial fertilizer. During the year 1913 there was sold in the State of Pennsylvania 330,321 tons of fertilizer, and the fertilizer material in the following forms:

| | Tonnage. |
|---|---|
| Complete Fertilizers, | 210,991 |
| Rock and Potash, | 73,812 |
| Acid Phosphate, | 23,104 |
| Ground Bone, | 8,524 |
| Dissolved Bone, | 559 |
| Tankage, | 392 |
| Blood, | 34 |
| Nitrate of Soda, | 2,532 |
| Muriate of Potash, | 2,780 |
| Sulphate of Potash, | 224 |
| Kainit, | 3,362 |
| Basic Slag, | 2,322 |
| Natural Guano, | 93 |
| Lime and Potash, | 35 |
| Miscellaneous, | 1,557 |
| Total, | 330,35 tons |

The total cost to the farmers was $7,578,501.21. These values are based on the average price per ton to the consumer. During the year 1913, there were 1,773, brands of fertilizers and fertilizing materials registered with the Department of Agriculture. License fees amounting to $30,930 were collected and turned into the State Treasury. During the same period the Department instituted 18 prosecutions for selling fertilizers that did not conform with the manufacturer's guarantee, recovering fines and costs amounting to $445.94. It also instituted six prosecutions for the sale of fertilizers without the manufacturer first registering same with the Department. Three of these cases had been terminated and fines amounting to $75 have been collected and turned into the State Treasury. The other three cases are pending. The defendants having plead guilty, adjustment of the cases being assured by the end of the present month. The total receipts for license fees, fines and costs collected by the Department of Agriculture were, $31,450.90.

In looking over this report we cannot help but see that the farmers of Pennsylvania are expending a great deal of money in order to keep up the fertility of the soil. The question naturally arises, Is this great amount of money spent to the best advantage? As a fertilizer manufacturer, I know that it is not, because a great many farmers buy their fertilizer according to the price and do not consider the analysis. When a farmer buys a low priced fertilizer, in many instances, it is low grade, and he is obliged to buy two tons in order to get as much available plant food as he could buy in one ton of a high grade fertilizer, and has to pay extra freight and extra commission; and by the time he does that, he has had to pay five or six or seven dollars more than if he had bought high grade goods. When the farmer buys a commercial fertilizer, he is after plant food, and what he ought to do is to buy the highest grade goods that the manufacturer makes, he not only buys it cheaper, but he buys plant food of superior quality and that is what the farmer wants. We make a fertilizer running, for instance, one half, seven and two, a fertilizer that no farmer should buy, a fertilizer that I never recommended, but we sell thousands of tons of it, and why? Because the farmer comes and he wants to pay, possibly $12 or $15 for a commercial fertilizer and no more. He can buy a fertilizer for that price, and the pitiable fact is that the farmer is not posted in nine times out of ten, take the country over. He does not realize what he is doing. In buying the low grade goods, he does not get the proper result and the consequence is that he condemns all fertilizer. If I am in the market for a fertilizer, I want just as much plant food crammed in that bag as the manufacturer can put in, and then I don't want to buy any more tons than I can help. Those same people who buy these low grade goods condemn the manufacturer for putting in a filler in making up the fertilizer.

We have another brand, six and three, just think of it, six of phosphoris acid and three of potash, and that is all it contains; but this is an honest confession; a fertilizer that should positively not be sold, but the manufacturer stands in the same position as the man who has a general country store, he has got all classes of customers and he wants to please them all, it is his business to do it. By the time the manufacturer has got the analysis on six and three, what has he got? Do you suppose he has a ton? No, far from it. The farmer would be better off if he'd send to him just what he has got, but then it wouldn't be a ton and the farmer wouldn't be satisfied. The manufacturer never made a cent on the filler; the only people that make money out of filler are the railroads, they get the freight. The manufacturer sells the analysis and not the weight.

I also feel that under the present law the farmers haven't got the proper protection when they buy their fertilizer, because the farmer cannot tell, by looking over the State Report, from where the different forms of so-called plant food come, and if the ammonia is derived from ground leather, it is practically useless as a crop producer. There are thousands of tons of ground leather sold to the farmers of Pennsylvania in the form of tankage. The manufacturer can use this material in his mixed fertilizer and when the State analyzes it, it will give the ammonia derived from ground leather as high a commercial value as that which is derived from animal tankage or blood. The ammonia can be bought in the form of leather scrap for less than one-half the price it costs in animal tankage, blood, or nitrate of soda.

I believe that the only way that the farmer can be protected is by having a fertilizer inspector whose duty it should be to go from factory to factory and see the fertilizer materials before it enters into the composition of complete fertilizer. This is especially important in regard to ammonia because it can be derived from so many different sources and it is a difficult matter for the chemist to determine from where the ammonia is derived in a complete fertilizer. Hence the easiest method of detecting the imposition which is practiced on the farmer is to see the material before it is manufactured into a complete fertilizer. The manufacturer who uses an objectionable material should be compelled to print it on the bags. If a law would be put on our statues whereby the above suggestion could be put into practice it would not only save the farmer of Pennsylvania millions of dollars but it would also stimulate the increased production of farm crops.

I could tell you of a plant where a friend of mine was this last week where he saw a thousand tons of ground leather in one pile; it runs all the way from 8 per cent. to 9 per cent. of ammonia. You can ask your State chemist of what value it is as a crop producer. If those manufacturers would take that leather and dissolve it with sulphuric acid, it would not be so serious, because ground leather dissolved is available plant food, no doubt, as far as the ammonia is concerned. You can take your old shoe, plow them under in your fields, plow them up again the next year and keep on plowing them down and up, and you can do that for ten years and the shoe is still there. If you take the original hide that that shoe is made from, it would soon rot and become plant food. The reason it does not rot in the form of leather is because the tanner that treated that hide put tannic acid in simply for the purpose of preserving it, and he does it most efficiently. Two years ago you had me on this same committee and I advised then the same remedy as that I have here tonight, and if you adopt it, it would reduce the cost of living.

The CHAIRMAN: Gentlemen, you have heard this report; if there are no objections, it will be received and placed on file. Next on the program is the report of the Committee on Wool and Textile Fibres, Mr. Sylvester Shaffer, Chairman.

Mr. Shaffer submitted the following report:

## REPORT OF COMMITTEE ON WOOL AND TEXTILE FIBRES

By SYLVESTER SHAFFER, *Newcastle, Pa.*

If, a decade ago, one were asked to forecast the future of wool, mutton and lamb production in this country, he would have hesitated to go on record. But when an industry has reached the vast substantial status that characterizes the sheep business today, one feels safe in making the prediction that the future of this great industry is one of promise. Time was when the sheep were almost despised as an article of diet in this country. If one ordered mutton he could almost feel the wool in his teeth; but a great change has ensued.

Always a great industry, the mutton side was overshadowed by wool. As far back as 1867 there were 39,000,000 sheep in this country value at $2.50 per head, while today there are but slightly more than 50,000,000 valued at $4.00 per head. The industry, according to government statistics, seems widely to have fluctuated. Stocks increased steadily. The maximum of production was reached in 1903, when there were 64,000,000, but so universal had been the use of fine wool rams that flocks had been bred almost without any regard whatever to mutton. Today with more than 13,000,000 less sheep than in 1903, it is a safe estimate that there is 20 per cent. more mutton consumed. So much for ten years.

Go back by decades. No one thought of killing lambs for the table four to six months old. Wethers was the ordinary mutton offered. In 1890 a load of Western lambs was almost a curiosity on the Chicago market; but just as in cattle, the baby beef sprang into popularity and relegated the old steer to the rear, causing a radical change in feeding methods, so, when the fat, tender, juicy lamb appeared, older mutton was neglected and the industry underwent a change. Old mutton was not wanted; everyone demanded lamb. The flocks of England were drawn upon for rams that would combine both mutton and wool. The Shropshire was the favorite and his individuality is stamped on the flocks of the United States today to a greater extent than any other breed. Crossed on the merino ewe, he produced a dual-purpose lamb to a lesser extent; Oxfords, Hampshires and the white faced breds. This year the proportion of native sheep to Westerns is decidedly smaller than a year ago; the farmers of Illinois, Wisconsin, Indiana and Michigan have simply flooded the market with useful ewes; and coming largely in the fall months, have had to sell for slaughter at low prices and go largely into cold storage. To see these ewes go to the packing house at just what the killers would consent to pay, gives concern to anyone who looks ahead to the future of the sheep industry.

I believe every farmer who is equipped with the facilities should keep a few good brood ewes. Free wool may cause some depression, but it may only be temporary as mutton is holding first place and a few cents a pound off does not spell the disaster it did some years ago; so the decline in wool production has been somewhat offset by the increase in the demand for mutton, resulting in the fact that the production of beef and pork has not kept pace with increasing population, the extent of which increase is indicated in the following statistics of receipt of sheep, hogs and cattle at the Chicago market during the past thirty years, 1880, 1890, 1900 and 1912.

| | 1880 | 1890 | 1900 | 1912 |
|---|---|---|---|---|
| Cattle, | 1,382,000 | 3,284,000 | 2,729,000 | 2,652,000 |
| Sheep, | 385,000 | 2,182,000 | 3,548,000 | 6,055,000 |
| Hogs, | 7,059,000 | 7,663,000 | 8,109,000 | 7,180,000 |

A glance at the above figures will tell the whole story. The sheep reaching the Chicago market last year was nearly double what it was in 1900. The increase in hogs was less than in 1890 and only slightly more than in 1880. In cattle, we find practically the same thing. What does this show? It shows the enormous increase in mutton consumption. The report of the investigators of the tariff board shows that the Western range country produces over 60 per cent. of the mutton supply of our country. This investigation also showed that the ranges are taxed to their full capacity, and in many cases, overstocked with sheep, so hence, increase from that section is impossible. Many farmers maintain that it does not pay to keep sheep on high priced land. Prices for mutton sheep that will produce a fair wool clip are bound to be good in the future.

The demand must be supplied from some source, and it looks as if it must be supplied from the farms in the Middle and Eastern states. If England can raise sheep on land valued at $300 to $500 an acre, why cannot we produce them profitably on much lower priced land? It is stated in a recent year book of the United States Department of Agriculture, that the per capita mean consumption in this country is 182 pounds compared with 121 pounds in the United Kingdom, 115 in Germany, 78 in France, 76 in Denmark, 70 in Belgium and 62 in Sweden. The same authority also states that the per capita of Australia is 262 pounds and of New Zealand, 212 pounds. These wide divergencies in meat consumption are explained by the fact that in new and undeveloped countries where land is cheap and people who occupy the land are few, meat is the cheapest article of diet.

The reason the sheep raising industry has declined in the West is that much of the land has been taken up for farming, and henceforth sheep men must own their own land and pay taxes and fence it. This means that the era of cheap mutton has passed. The same is true of beef, and the American people, no matter how they like the prospects, are face to face with the necessity of reducing their per capita consumption of meat to something near England and Germany and other countries. There seems to be no other way to keep the cost of living on a parity with the earning power of the average man. It may turn out that this may be a blessing in disguise, as most authorities agree that a reduction in the amount of meat consumed by Americans would be beneficial to the health of the people.

Of wool producing countries, the United States ranks third, yielding in 1910, nearly 300,000,000 pounds of wool with 51,638,500 sheep. Pennsylvania ranks thirteenth in wool production, eleventh in numbers. Pennsylvania has thousands of acres of land better adapted for wool and mutton production than any other livestock industry, and when one considers the important fact that the population has increased 20 per cent. in the last decade and that sheep stock have decreased 20 per cent., that inevitably the ratio will widen, that the public taste for mutton shows constant improvement, it would seem that anyone situated so they can handle a flock of good wool and mutton sheep should receive substantial returns. Dogs and parasites are, to some extent, detrimental to the raising of sheep in Pennsylvania; but a good dog law, well enforced, and care and good management would overcome these to a large extent, and as the fertility value of sheep manure is above that of other livestock, it would seem that there should be more wool and mutton produced in Pennsylvania than is being produced. ,

The CHAIRMAN: This report will also be received and placed on file. We will now have an address by Prof. McDowell, "Carrying the College to the People."

The address is as follows:

# CARRYING THE COLLEGE TO THE PEOPLE

By **PROF. M. S. McDOWELL**, *State College, Pa.*

Mr. Chairman and Members of the State Board of Agriculture, Ladies and Gentlemen: Over four centuries ago Columbus sailed westward in the belief that a shorter route to the East Indies might be found. What he actually found and what has developed from this discovery we all well know. A shorter route from the Atlantic to the Pacific has been the dream throughout the centuries since this country was first discovered. In 1915, a little more than a year hence, a great Exposition will be held on the Pacific Coast to celebrate the realization of that dream in the completion of the Panama Canal. This canal is looked upon as one of the great accomplishments of the age. It has been a stupendous undertaking from an engineering standpoint. Its completion marks on epoch because of what it makes possible in the way of transportation facilities. As ships of all nations of the world pass through its portals it will stand, for time to come, as a monument to the genius of our people.

While its construction has been an engineering problem, there are many factors which have contributed to the success of the undertaking and there is one particularly which appeals. The French Government, at one time attempted to build a canal across the Isthmus, but was forced to give it up; not on account of the engineering problems involved, but because of unhealthy conditions which made it impossible to maintain an efficient working force. In fact, Panama became a veritable graveyard of their hopes. Have we heard of any such difficulties during the building of the present canal? On the contrary the Canal Zone has been made comfortable and healthy. The death rate is lower than many, if not in most, of the well-regulated cities of the United States. What has brought about the change in conditions. The discovery of new principles underlying the causes of disease, and the application of those principles to the art of medicine in eliminating the causes and treating such cases of illness as develop. There are great medical research laboratories incessantly at work developing new knowledge. The improvement in the practice of medicine (and we must agree that there has been great progress, and there is room for more) has taken place in proportion to the extent to which the practical application of the discoveries of science have been available to the physicians.

The program of this meeting, I believe, has been arranged with a view of bringing the members of this Board into closer touch with the several departments of the State Government. As a representative of The Pennsylvania State College, an educational institution supported by public funds, National and State,—your institution, if you please—I have been invited to tell you what the College is doing, not so much in the way of teaching students within its walls, but rather in the broader field of carrying to all people of the Commonwealth, the help which the Institution can furnish.

You are familiar with the Land Grant Act passed by Congress in 1862 and providing for an institution in every State of the Union whose chief object should be, in the words of the act itself: "To teach such branches of learning as are related to agriculture and the mechanic arts, not excluding classical and other scientific subjects, and including military tactics, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." This act was accepted by the State of Pennsylvania. It early became evident that if satisfactory teaching in agriculture was to be given there must be forces at work developing the principles which underlie agriculture. This resulted in another act by Congress establishing in every State an Agricultural Experiment Station, whose duty it should be to develop fundamental truths upon which farming rests. Almost without exception these Experiment Stations have been organized as integral parts of the Agricultural Departments of the Land Grant Colleges. The Experiment Station is the research laboratory which is at work developing facts underlying the business of farming. Within the last two or three decades, a large amount of information has been accumulated which has come to have a very practical value. The Extension Service of the College is the machinery through which these facts are carried to the people for whom this work has practical value. The research work, as with medicine, is effective in proportion to the extent to which it is disseminated and applied. We all recognize the practical experience in farming is essential.

If one is to choose between practical experience only on the one hand, or theoretical knowledge on the other, all of us would choose the practical experience. It would be our only chance of success. On the other hand, a knowledge of the underlying facts will enable us to work out a better practice. Practice and theory must go hand in hand. There are some things that can be learned only by practice, on the other hand there are many things which practice will not teach. Hauling manure is a very practical operation, but experience here does not teach that the manure is more effective on our Eastern soils if phosphoris acid is applied with it, nor does it teach that the fertility of the soil may be maintained indefinitely if clover is grown regularly in a rotation and phosphoric acid and potash are applied, even though no manure or organic matter is ever applied to that soil. We recognize that the educational factor is not the only one which contributes to success. There are problems of distribution which have a very important bearing. In our extension work endeavor is made to keep in mind the idea of increasing net returns. I wish to tell you briefly of the lines of work now being carried on.

*SHORT COURSES:* One of the excellent forms of Extension teaching is the Winter Courses in Agriculture, offered for twelve weeks during the winter months. These courses are designed for those who cannot give four or even two years to college study, but who can give three months to better fitting themselves for life on the farm. At the present time, 176 students, representing 52 counties of the State, are taking this work. About 15 of these students have previously been in attendance at the Short Course and have come again to take subjects which it was impossible to get on their schedule in other years.

*FARMERS' WEEK:* For the farmers who can not conveniently leave home except for a limited time at certain seasons of the year, a Farmers' Week is held at the College. This meeting is an effort to place the facilities of the institution at the service of the farmers of the State so that they may have actual college advantages for a few days, at least. The Farmers' Week, which occurred December 29th to January 3d, was the most successful ever held. There was a registered attendance of 980, representing 62 counties of the State. Comments from many sources, both written and verbal, indicate that this meeting has much practical help for those who attend.

*CORRESPONDENCE COURSES:* The College maintains Correspondence Courses in Agriculture. Thirty-six different courses are offered. At the present time, 4,000 students are enrolled. Most of these students are from Pennsylvania and every county in the State is represented. Every course consists of a series of lessons. A list of questions accompanies each lesson and written answers to these questions are required before another lesson is sent. These papers are corrected, written suggestions and criticisms are made where necessary, and the papers returned to the student. This enables the instructor to keep in closer touch with the work the student is doing.

*FAIR EXHIBITS:* An educational exhibit setting forth the results of many of the most important experiments and suggesting the practical application of these results has been prepared in duplicate and is sent to County Fairs. In addition to this educational exhibit, a livestock exhibit, representing the various breeds of dairy cattle, beef cattle, sheep and swine, is included. The entire exhibit is housed in a large tent 30x80 feet. Two members of the staff accompany this exhibit to meet the people and answer inquiries. Last fall, 14 fairs were visited. About 500,000 people passed through the tents and thousands of questions were answered.

*FARM EXAMINATIONS:* Large numbers of requests are received asking for farm examinations and advice. These requests are met so far as it is possible to do so. Since last fall, 30 farms have been examined and suggestions made for treatment. In most instances the traveling expenses of the men doing this work are paid by the individuals asking the service.

*DAIRYING:* Pennsylvania stands third in the Union as a dairy State. Endeavor is made to serve these interests to the greatest possible extent. One member of our Extension staff gives much of his time to dairy work. This work covers both the producing and manufacturing side of the dairy business. Individual farmers and communities are visited; suggestion made as to improvement of herds, the use of a better balanced ration, and in many instances cow testing associations have been formed. Wherever such associations have been formed, the results have proven very satisfactory and helpful. A number of creameries have been visited and aid given.

*CIRCULARS:* Forty-two circulars upon subjects of frequent inquiry have been prepared. These circulars are used to answer inquiries rather than to mail to any regular mailing list. They are, however, sent to anyone who requests them. A list of these circulars may be procured upon application.

*THE EXTENSION BULLETIN:* Recently a monthly publication called "The Extension Bulletin" has been inaugurated. This bulletin does not take the place of the regular research bulletins, but is meant to carry information of a more general character. It will also be a means of keeping those on our mailing list in touch with the affairs of our School of Agriculture.

*SPECIAL EXCURSIONS.* The Pennsylvania Railroad has within the last year run a number of special one-day excursions to the College. In this way about 2,500 visits have been brought there to look over the work of the institution. One of these excursions alone brought 1,800 people. This gives the farmers of the State an opportunity to see the scientific work which is being done as well as the practical application of the results of this scientific work to farm practice. It gives the farmer an excellent idea of the close relation which exists between science and practice and secures his confidence to a much greater extent than might otherwise be possible.

*BOYS' AND GIRLS' CLUBS:* The College has had a large part in the development of an interest in young people's work. A corn growing contest was inaugurated some years ago. Now many other organizations and interests are taking up this work and helping to make it more effective. At Farmers' Week, a month ago, over 100 samples of corn were exhibited in the boys' corn-growing contest. There is nothing which arouses interest like competition, and this is one of the ways in which the young people may be interested and at the same time it helps to improve crop production.

*COUNTY AGENTS:* Perhaps the most effective form of Extension work which the institution is doing is the establishment of a representative of the College and Experiment Station in a county. Nine counties of the State now have a County Agricultural Agent. The presence of these men in a local community makes possible a personal contact which can not be had otherwise. These men study the local conditions and are able to advise with the farmer in regard to many of his problems. There is a growing demand from the several counties for County Agents. A word as to the qualifications of the men who become County Agents is probably desirable. In the first place, a man must have had good farm experience, so that he knows the problems from the farmer's standpoint; in the second place, it is necessary that he have good fundamental training, such as is given in a four years' college course in agriculture; and thirdly, he must have a pleasing personality. This work is probably limited as much by lack of trained men as by lack of funds. Men, however, are being trained gradually who will make excellent County Agents.

*MEETINGS:* Since July 1st, men from the School of Agriculture have attended 95 meetings and given addresses. It is not possible to meet all the requests which come to us for this kind of work, although every endeavor is made to do so.

*CORRESPONDENCE:* The correspondence is heavy and thousands of letters are sent out annually in reply to inquiries. Many of these lines of work are limited in scope because of lack of funds and cannot be further developed. There are additional activities which can be profitably taken up.

Thus far what has been said relates to agricultural activities. The work of the College is along broad lines. The Organization consists of five great Schools, Agriculture, Engineering, Mining, Natural Science, Liberal Arts and Home Economics. At the present time there are 2,280 students taking work at the College. Of this number, 1,125 are in the School of Agriculture. The College is serving, not only agriculture, but other interests as well.

*ENGINEERING EXTENSION:* During the last three years the Engineering Extension Division of the college has been conducting apprentice schools for shop men at Altoona; and more recently similar apprentice schools have been established in Harrisburg and West Philadelphia. These are "day" schools which the men attend four hours every week. They are conducted by resident teachers under the supervision of the Engineering Extension Division of the college. More than three hundred are now receiving a practical form of education in these schools. Negotiations are in progress for establishing night schools in vocational subjects at Sunbury and Harrisburg. It will be observed, therefore, that in Harrisburg there are both day and night schools; the night schools for more mature shop men, particularly machinists and pattern makers. In the shop of the railroad at Tyrone very large night classes are now being conducted successfully. Plans are also being arranged for establishing similar schools in vocational subjects for shop men at Meadville and Scranton. In Philadelphia the work has been organized on a very much larger scale than anywhere else. In that city extension classes for shop men are being organized in various parts of the city in co-operation with the educational department of the Central Young Men's Christian Association. Most of the classes will be organized with resident teachers and will be devoted particularly to such subjects as shop arithmetic, shop sketching, mechanical drawing, heating and ventilation, and strength of materials.

A very elaborate educational campaign is being conducted in Erie. The general method is practically the same as in Philadelphia, except that a very much larger number of courses are being offered. In Erie this extension work has the active co-operation of the Board of Trade, Chamber of Commerce, and of the local labor union as represented by the editorial staff of the labor paper. Vocational classes for employed men and boys have been established and conducted successfully for the last three years in Williamsport. The first two years only one teacher for vocational subjects was employed but there are now two teahcers. Arrangements have been made to co-operate with the educational department of the Young Men' Christian Association in this city, so there will be no duplication of the courses offered. This seems to be an ideal arrangements and similar methods of co-operation can probably be followed out in a great many other places. Successful vocational classes are also established in Johnstown, Pottstown, Pottsville, Oil City, York and Allentown.

Organization of this work in Lawrenceville, Lancaster, West Chester, Reading, DuBois, Scottdale, Jersey Shore, Norristown and Chester is being affected. The courses in vocational education are not free as it is believed that the courses can be conducted more satisfactorily if a small fee is charged. The total cost for a course of twenty lessons is about $7.50, including text-books, extra assignment sheets, and instruction. In the case of large classes, of say twenty or thirty students, these fees are sufficient to pay for the instructor. In the advanced subjects where smaller classes must be conducted, special arrangement are made for carrying on the work. Methods of organizing classes are more or less flexible, and it is the object to do all that possibly can be done with the limited funds available to provide the opportunities for all the men employed in the shops and factories of the State.

*MINING EXTENSION:* During the past few years some extension work was caried on by instructors from the School of Mines. This work included, during five weeks of the summer months, evening classes for miners, in the mining towns of Central Pennsylvania and a few lectures on geology and travel delivered before teacher's institutes. In the evening classes in mining, invididual assistance was given to the students in various elementary subjects as well as in mining, it being found that many of them required the elements of English, arithmetic and physics before they could proceed with the work in mining. The coal companies concerned gave active assistance to this work. It is intended during the present year to conduct courses of lectures in mining, geology and allied subjects in so far as funds are provided for this work. There is large opportunity here for service to individuals, to committees and to the State in the making of better and more effective workmen and citizens.

*LIBERAL ARTS:* In the school of Liberal Arts, several courses dealing with different phases of English literature have been given. Addresses have frequently been given before teachers' institutes, directors associations, and high school commencements. Correspondence courses are offered to students who have been in attendance at one or more summer sessions. By completing such courses and by attending summer sessions, the first two years of a regular four years' college course may be completed.

*GENERAL:* A plan has been formulated for giving general lectures wherever possible. High schools, academies, normal schools, colleges, teachers' institutes and associations, lyceums of Chautauqua courses, churches, Y. M. C. A.'s, clubs and societies of all kinds can secure lectures singly or in series by making application to the college. Some of these lectures are illustrated, some are not; but all are designed to meet a need between a strictly scientific address and a popular entertainment.

*HOME ECONOMICS:* The Department of Home Economics have done a limited amount of extension work. It is expected to develop this work so that what is done for the farmer's daughter may be on a par with what is being done for the farmer and his son.

To accomplish results, requires hearty co-operation. What your educational institution can accomplish depends upon the people and especially upon the farmers of the State even more than on the College. A stream can rise no higher than its source. The people of the State are the levers which move its affairs. We, therefore, ask your hearty and cordial co-operation in the future, as it has been given in the past, to the end that all the people may be served and especially that Pennsylvania agriculture may grow not only in stature but as well in the material prosperity and happiness of her individual farmers.

The CHAIRMAN: We have certainly all enjoyed that helpful address, which will be filed with the Secretary.

MR. HUTCHISON: If it would not take up too much time, I would like to add a word here as your representative on the Board of Trustees. I will not take but a few moments. You may want to know what we are doing with the money that has been appropriated by the last Legislature in regard to buildings to take care of the agricultural end of the college, and as a member of the Building Committee, I would like to report to you, and through you to the farmers to the Commonwealth, that we are completing the Horticultural building at a cost of $725,000. The plans are being perfected for a stock judging pavillion for the use of the agricultural students, at a cost of $30,000. We have the plans perfected and are ready to have the contract about let for a $20,000 dairy barn; this makes $125,000 of the money that was set aside, of $400,000 for buildings.

Now you may say that agriculture should have some more of this, but I want to state that one thing to you that you may understand that those young men who are taking a course in agriculture, a four year's course, have to be taught for two years in the other schools, the school of Liberal Arts and the Engineering School and other schools that lead up to specializing in agriculture, and the great demand was for a Liberal Arts building. Bids were opened last night for the building of this building at a price of about $85,000. This will take care of the boys and girls, or help to, for the first two years. Now there was $10,000 set aside for the building of a laboratory for Home Economics. There has just a little criticism come out that we did not spend $50,000 to build an addition to the ladies' department or the Department of Home Economics, but if we had taken that money, we would have built two small units, one for Liberal Arts and one for the ladies' department of Home Economics and neither would have been up to the standard they should have been, so they have given the ladies a portion of the Liberal Arts building for teaching and are building this laboratory for $10,000 for the work in that department, and we built last year a kitchen or dining hall and dormitories to take care of some fifty additional students.

Now we are just doing the very best we can with this money and the bids are advertised. We have got splendid architects; they are doing just the very best they can to get every dollars' worth they can for the college and I hope that we will be successful. I am confident that the architects who have charge of this work are just as good as money can secure in this great State of ours. They are the architects that are building the buildings at Princeton and Cornell and the University of Pennsylvania and a number of other colleges, so you can see that these men thoroughly understand their business, and we hope that from the next Legislature we will get enough money to put up another unit for the Agricultural Department there to take care of this great incoming of the wealth, which are the young men and young women of this State seeking a better education, and you are the men, you are the representatives of the people that can go back to the people and show them what the needs of this great Institution are, and we will have to rely on you men preaching that gospel, taking it out to the people, and on you women who go out through this Commonwealth, to lift up this college and put it on a higher plane and make it the greatest institution in the United States.

The CHAIRMAN: You do not offer that as a final report, do you?

MR. HUTCHISON: No, I just wanted to give a report as a trustee on the Board.

The CHAIRMAN: Next on the program is a report from Prof. Franklin Menges, Entomologist.

Prof. Menges gave his report as follows:

## REPORT OF ENTOMOLOGIST

By PROF. FRANKLIN MENGES, *York, Pa.*

Nothing new or startling has developed in the sphere of the insect world, except that from several sections of the State reports have come that the aphids have attacked the roots of peach trees and have given some trouble to orchardists as they always do to farmers. These plant lice, as they are generally named, are well known to all farmers because of the injury they do at one time or another to the regular farm as well as the garden crops. In those insects we have a strikingly apparent exception to the rule that insects are developed from eggs that can be found in the insect world. Reproduction in a large percentage of these insects occurs normally without the intervention of a male. In the colder sections of the country, plant lice winter in the egg stage, while in the warmer parts, they may pass the mild winters as the fully developed insects ready for operations every day the weather is sufficiently warm for plants to expand in the sunlight. Early in the spring in the wilder sections when the days become sufficiently warm for vegetation to revive, a wingless insect emerges from the egg and begins sucking the plant juices when the plant is making strenuous efforts to get started and weakens it at the very start. The insect is wingless and usually remains wingless. It grows rapidly and soon begins to give birth to living young. It is called a stem mother, because from it numerous generations of these insects issue during the growing season. All the young born from this stem mother are sexless; they are neither male nor sexually developed females, and like the stem mother, produce young without the intervention of the male. The rate of reproduction depends largely upon weather conditions and when these are favorable, as many as eight living young may be produced in twenty-four hours and one single large louse may be surrounded with a group of from twelve to twenty or more specimens of living young. The rate at which these grow also depends on the weather; in fact the weather of the early spring frequently determines whether certain species of plant lice shall become injurious. Continuous warm, moist spring weather favors their development but when the mild weather is followed by cold, rainy weather, after these insects have developed and given birth to young, which are still weak, and when, because of the cold weather the flow of the juices of the plant upon which they live has been staid and they have little or nothing to feed upon, large numbers die and in this way by a few cold rainy days in the spring a destructive insect may be so reduced in numbers or so weakened, that it cannot revive suffiently to materially injure the crops it usually infests during the growing season.

So that all things that appear as holding back agricultural operations in the spring, are many times of more benefit than injury. If, however, weather conditions are favorable and a sufficient food supply is available, the young first produced will, within five or six days after birth, bring forth the second generation of young, some of which may develop wings and fly away to other localities where the food supply may be more abundant, and start new colonies. The first generation may develop wings while others remain wingless, and in this way within a month when weather conditions are favorable, many hundreds of acres may be infested by the progeny of a single individual. This happens only when all conditions are most favorable, which is so seldom the case that no one may get scared about the depredations of these insects to such an extent as to threaten the food supply of mankind.

Another thing. As the summer advances and the tissue of the leaves of plants hardens and the supply of sap is not so plentiful as in the spring and the food supply of the insect is limited, reproduction becomes less until, in the fall, with the stopping of plant growth, it entirely ceases. During this period it becomes necessary, in the colder climates, to provide for the continuance of the species, and fully developed sex forms appear, the males a short time before the appearance the females, the former having wings; the females are wingless. Pairing takes place as soon as the female is fully developed and in a few days afterward, eggs are laid in a sheltered place on plants which begin growth early in the spring, and, in the case of orchard trees, around the buds, where growth begins first. These eggs are difficult to detroy because they are covered with a substance that will resist all insecticides, except strong caustics such as probably the lime sulphur mixture with caustic lime added.

There are many exceptions to this life history, one of which we have in the hop louse which spends its summer on the hop vine and frequently becomes so plentiful that much injury results from this attack. As is well known, the hop vine dies down completely in the fall and does not start early in the spring, furnishing no food supply for the first generations; consequently, after its males are developed and the hop vine dies down, these migrate to plum trees where the females are born, the sexes mate and egg are laid. In the spring, two or more generations develop on the plum trees until the hop vines have sufficiently developed, when they migrate to their summer food plant; therefore plums should not be raised where hops are grown.

Another thing about these insects is their capacity to excrete a sweetish substance known as honey dew. Frequently when the sap of infected trees flows fast and the food supply is abundant, these insects gorge themselves with sap and, to ease themselves, they void through the anus and socalled honey tubes this sweetish liquid, so that the leaves of these trees become sticky and glazed over and the pores become choked so that the leaves die and drop to the ground. Even the vegetation beneath thee trees becomes coated with this fluid, or the pavement under infested trees in cities become slippery from the dropping of this viscid fluid, ants, wasps and bees feed on this fluid, especially ants are attracted by it, and with their well nigh human instinct they cultivate the society of these plant lice. Frequently in the loamy and sometimes in the clayey soils, not so much in the sandy types, small ant hills abound in the spring. In a short time after this, the roots and leaves of plants become infested with plant lice, and it will be found that, instead of the ants destroying the plant lice, they protect them and assist in their development, so much so that some species are dependent upon the ant for their winter quarters and an early start in the spring. These species of plant lice usually feed upon roots and spend their lives underground, among which is the corn root plant louse. Another is the phylloxera of the grape and the one referred to in the beginning of this paper found on the peach roots. In the case of the corn root louse, probably the best remedy is the use of kainit of which, in order to get a sufficient amount of potash to supply what the corn plant needs, a large supply of the salts of magnesia, with some lime, is mixed with the muriate and sulphur of potash as to prevent the attacks of this louse to a large extent. In the case of peach trees, an application of ten pounds of kainit spread evenly on the surface as far out as the roots of the tree extend, will usually destroy the louse. Tobacco in a trench around the encrusted tree or before planting the trees, is a splendid method of preventing infection, and will either keep the insect away or will destroy it. It seems that tobacco finely ground when sown with the fertilizer in the row with corn or with the fertilizer in grass fields or grain fields, would be both beneficial for the crop as a fertilizer and a destroyer of these insects. It seems, too, that every farmer should raise an acre or two of tobacco, to be ready for destroying these insects. Clean fences, fertile land and good, clean farming are the best remedies for preventing the development and spread of these insects. Numerous parasites also check the inroad of these insects and whenever their numbers increase beyond a certain limit, the parasite becomes formidable enough to check further increase.

The CHAIRMAN: This report will be received and filed with the Secretary. We will now hear the report of the Ornithologist, Professor Surface.

The report is as follows:

# REPORT OF THE ORNITHOLOGIST

By PROF. H. A. SURFACE, *Harrisburg, Pa.*

It becomes our duty to prepare the following as our Twelfth Annual Report as Ornithologist, to the State Board of Agriculture. Another year has been filled with opportunity for observation and thought, and has brought us nearer to the solution of certain problems. We feel that one of the greatest steps toward the protection of our native birds was in the act prohibiting unnaturalized foreigners from carrying guns or firearms in this State. Such an act has recently been tested in other states of the Union, and has been decided constitutional. The foreign element, coming into our country and seeing more birds than they have been accustomed to in the old country, evidently thought there were birds to slaughter in this "Country of the Free," and consequently proceeded to get guns and start the killing. The law now prohibits this, in recognition of the fact that the supposed liberty which results in the destruction of another man's property or pleasure can not be tolerated. Our wild birds contribute to both the economic prosperity and ethical pleasure of most of our citizens. There is thus definite reason why our efforts should be redoubled in an active manner toward establishing and maintaining public sentiment favorable to the enforcement of the law by the game wardens, who represent that important arm of the State known as the State Game Commission. The next important step was the Federal enactment placing migratory birds upon a basis of Federal protection in various states of the Union to which they migrate. Now we no longer anticipate the ruthless slaughter of the bluebirds or robins as sport or for food by the shiftless negro or thoughtless gunner in the South. Thus we need not anticipate such a condition as is set forth in the following article from a paper in Indiana county this month:

### "ROBINS DRIVEN TO COLD NORTH BY HUNTERS"

**Thousands of Birds Which Came Here for Safety, Freeze in Woods**

> For the past three winters large numbers of robins have been found in the woods of Pennsylvania, much to the surprise of those who know the habits of the red breast. Two years ago during the severe winter weather thouands of the birds which sought shelter in the Pennsylvania woods froze to death. While R. W. Wehrle and a number of the members of the Boys' Naturalist Club were returning from Kintersburg on Saturday afternoon they found a flock of probably 200 robins in the woods at Grove Chapel Church in Rayne township. The birds were extremely wild and at the approach of the party flew in a northwesterly direction. When asked for a reason for the appearance of the birds in the north at this time of the year, Mr. Wehrle

> said that they were driven north by southern hunters who have been killing robins in large numbers during the past three months, as the birds are not protected by law in the Southern States. Mr. Wehrle said that the apparently wild condition of the flock of robins encountered on Saturday was no doubt due to fright resulting from being hunted in the south, and finally driven north to live on wild graped and shumach, or freeze, as thousands of the songsters have done during the past three winters. According to Mr. Wehrle large numbers of robins froze in the Pennsylvania woods two years ago during the severe winter weather. In addition to the robins, the bobolinks, flickers and martins, all insect destroying birds and loyal friends of the farmers, are killed in large numbers by southern hunters, and have had to seek safety in northern woods, where many of them freeze each winter."

The next important step in bird protection is as wide in spirit as the circumference of our earth and as altruistic as the area of man's heart. It is our pleasure to report Federal legislation providing against the importation of the feathers of birds or parts of birds belonging to families represented in the United States. This has been regarded as a blow to the millinery trade in feathers, but it is, in fact, for the protection of birds in other countries. It is not generally known that some of our birds, such as the common Tip up in this country, migrate clear across South America into Patagonia and return. Without such a law nothing could prohibit the hunters in the West Indies and South America from killing myriads of our native birds during the winter and sending them into this country for supposed decorative purposes.

Now such a thing is impossible. Not only is there prohibitive legislation of this kind, but, fortunately, it is being enforced. Aigrette tips, speaking a visible story of parents slaughtered during the breeding season and young starved in their nests in the tropical and subtropical regions, may be displayed on the heads of thoughtless or ignorant women as they leave this country on a trip to Europe. but on their return they find the keen eyes, the strong arm, and the sharp shears of Uncle Sam's agents busy in detecting and snipping all such plumes and feathers from the garments of the immigrants. As with all legislation that is admirable in most regards, this also has had its ridiculous side, when given its most strict interpretation, as, for example, when a wealthy New York citizen wished to import a dozen English pheasants for a dinner he was to give his friends, and found that while there was no law against the importation of the pheasants, there was a law against importing their feathers, and the custom officers decided that the birds should be picked and the bodies sent to their destination, while the feathers were confiscated.

The next great event of the year, relating to birds, was the passage of the Gun License Law in Pennsylvania. We who are owners and residents of farm property can truthfully say that from the first time in the history of our State, we have a law that has resulted in adequate protection of our lives and property from thoughtless or irresponsible gunners, and especially from the town hoodlum. While there may be some objectionable features to a law which is so comprehensive in its application as the Gun License Law, yet we must say from personal observation that it has resulted in better conduct on the part of gunners than we have ever before observed. They have been willing to come to the land owners and ask for permission to hunt upon the premises, and have been more careful to avoid shooting near buildings, among trees or around livestock. The number of young boys carrying guns during the last season was less than previously observed, and the number of gunning accidents was far below the list formerly recorded. The idea of a tag and conspicuous number, which originated in this Board one year ago, has proven excellent.

The game laws of Pennsylvania are the cause of biennial effort on the part of ambitious legislators. There is more or less undesirable shifting, and I regret to say that in the opinion of your Ornithologist at least one step was taken which is very objectionable. This is the provision of a bounty for two hawks and an owl; the sharp-shinned hawk, *(accipiter velox)*, the goshawk, *(accipiter atricapillus)*, and the great-horned owl, *(bubo virginianus)*. It is to be admitted that the sharp-shinned hawk and the goshawk are both marauders, feeding chiefly on game, small birds or poultry, but they also are beneficial, feeding at times upon rats, mice, rabbits, insects, etc. The goshawk is with us only in the winter time and is a rare bird in this State. It preys chiefly upon rabbits and ruffled grouse, but in destroying the former it performs a neded service for the increasing number of orchardists in this State. More can be said in favor of the great-horned owl than against it, but the chief point regarding the bounty on these birds is that the principle is wrong. Nature has its balance, which is self-operative. Mankind, in his ignorance, is too liable to interfere with and overthrow this. Also, very few persons distinguish between the different species of hawks and owls. For example, the long-eared owl *(asio wilsonianus)*, which is one of our most beneficial birds, is rightly protected in this State at all times of the year by the present law. It is in every way as illegal and punishable to kill a long-eared owl as to kill a song sparrow or bluebird; yet under the stimulus of a fifty-cent bounty, the gunner, upon seeing such a bird, may easily imagine or hope that it may be the great-horned owl. Upon shooting it and presenting it to a justice of the peace, the latter may not be sufficiently educated in technical ornithology to know the different species of protected and unprotected birds and even pay for one that is protected.

For example, there are sixteen species of hawks or representatives of the hawk family *(Falconidae)* possible to be found in this State. What justice of the peace would be able to distinguish between representatives of various protected species of these and the duck hawk, pigeon hawk, and cooper's hawk, which are on the unprotected list, and for which no bounty is given, and the sharp-shinned and goshawk, upon which a bounty is offered. Let it be remembered that most of our hawks are of the red-shouldered *(buteo lineatus)*, or the red-tailed *(buteo borealis)* species and are protected by law at all times. Also, while the law sets a bounty of fifty cents for the sharp-shinned hawk and goshawk, yet twenty-five cents must go for the affidavit, and the gunner only obtains one quarter of a dollar as bounty, and also runs the risk of having killed a protected species. which would lay him liable to the same penalty as from destroying any other bird of a protected species. We deplore the law-breaking ignorance manifested by those persons who persist in stretching the remains of some raptorial bird upon a board, tree or building along the road near a residence. It is not uncommon to see a hawk or owl nailed to a barn, as though to display the prowness of the gunner, when, in fact, it is generally a protected species, and in all cases, is an exhibition of the ignorance of mankind.

Dr. Kalbfus this afternoon called attention to the cuckoo as an insectivorous bird, the stomach of which, he rightly avers, is lined with the hairs of caterpillars. I took fifty-two hairs from the stomach of one cuckoo and I know of a definite case of a boy who shot a cuckoo and took it to a justice of the peace and got fifty cents bounty on that bird because the justice thought it was a small hawk. I know that is absolutely true. In most cases the birds so displayed are the red shoulder and red tailed hawks, which are protected by law. Let a note of warning here be sounded, that the wardens of the Game Commission are authorized to enforce the law, and there is liable to be arrest for killing protected birds, among which are certain species of hawks and owls.

Let us help to put an end to the confusion by abolishing the bounty for the two species of hawks and the one owl named in the Bounty Act. The birds which at present, are not protected by law are the following: The English sparrow, the English starling, the bluejay, the kingfisher, the buzzard, the sharp-shinned hawk, cooper's hawk, goshawk, pigeon hawk, the great-horned owl, barred owl and crow. The only two whose absolute destruction in this country we earnestly recommend are the first two named, which it will be noted are the foreigners. If we can, through legislation, education, co-operation and otherwise, destroy or suppress the English sparrow and the English starling, we shall be rendering a service to mankind that is worthy of our effort.

In this connection we recommend using both of these birds as food. Prepared like the reed bird or rice bird the English sparrow can well take its place. A gentleman from Reading writes us that he takes the young English sparrow from the nests when they are in the condition of squabs and cleans and cooks them, finding them excellent eating. He further adds that he has observed this bird destroying the robin, orioles and other birds in his region. This is in accordance with observations previously reported to you by your Ornithologist. It would not be difficult to keep the English sparrow from nesting on the premises. A campaign for the regular monthly extermination of its nest is earnestly recommended. Get the boys started. It is the pleasure of your Ornithologist to report that the quail or bobwhite has increased in considerable numbers in this State during the past two years. The country boy can now find it possible to enjoy the shrilly whistled morning call of this bird, and to reply by imitating its notes, as we have so often done. An officer in the State Conservation Association writes to us concerning the quail, as follows:

> "I noticed your fight in the Legislature for birds, with which I was quite in sympathy, and appreciate your efforts so much that I wish to help the good work along. Last year I planted a field of millet and let it stand. This winter hundreds of birds are feeding on it, and they seem to enjoy it. Now we wish to stock it with bob whites. Can you tell me where I can secure birds?"

We replied to him that they are best obtained through the State Game Commission, which has imported some from the Southern States. Decided interest has been shown by many persons in feeding the quail during the recent period of prolonged snow. This is excellent work, as it does not eat the buds of trees, as does its relative, the ruffled grouse, also called pheasant. Knowing that buckwheat is one of the best articles of food for this bird many persons have purchased this grain during the present winter to feed to the quail. Without desiring to do any advertising, we can inform interested persons where they can purchase a quantity of buckwheat for this purpose at the present time. The writer of this report last summer sowed buckwheat as a nurse crop with crimson clover, for the purpose of fertilizing the soil, and obtained excellent results. The buckwheat started soon to grow, shaded the ground, and kept it damp, and the clover came on well. The buckwheat ripened, and part of it was left in the field for the quail, which are feeding upon it now, and the crimson clover is there to give the best clover crop for the orchard. We recommend sowing from one peck to one-half bushels of buckwheat and eight quarts of crimson clover to each acre of corn ground at the time of last working of the corn. This will be found good agriculture from the standpoint of soil fertility, and also a good means of feeding seed-eating birds in winter time, such as the bobwhite or quail, also called the partridge in the Southern States.

The office of the Economic Zoologist of the Department of Agriculture has published press letters on bird conservation during the year 1913, giving information concerning the legislation and protection of migratory birds, and other information in economic ornithology, which has been widely copied in the press of the State. It is also completing an elaborate bulletin upon the economy and habits of the Passerine or smaller birds in this State. A novel feature of the year in ornithology should be recorded as it is in connection with the popular effort to preserve purple martins and induce them to colonize around the premises. Many persons who, in accordance with our directions published some years ago, have erected martin boxes, find that these very interesting and altogether beneficial birds are coming to their boxes for nesting purposes and are multiplying. Mr. J. P. Reiff, Secretary of the Fish and Game Society of Montgomery county, in attempting to move some martins to his premises in Norristown, waited until the adult birds had young in the nests, and then closed the boxes at night and moved them; but a carpenter working near them the next day made so much noise that the old birds in their fright and bewilderment departed for other regions. Nineteen of the young birds were left in the nests. With boiled eggs, mashed potatoes, lettuce, pieces of lean meat, milk, meal worms and other insects, Mr. Reiff fed these nestlings until they reached maturity. The amount of food they consumed was something marvellous, amounting to tens of thousands of meal worms. They would eat more than their own weight in a single day.

The details of this are published in that sprightly Pennsylvania magazine alled "In the Open," published at Pittsburgh. After the young martins commenced to fly they became so tame that they could be called from afar by a whistle, and a single call would be enough to bring them from away in the atmosphere in great numbers to pearch upon their preserver. Mr. Reiff's task was so intelligently performed that he succeeded in rearing to maturity sixteen of the forsaken nestlings.

A proposition is now going forth which your Ornithologist endorses and recommends for favorable endorsement by this Board, and that is the setting aside in each county of at least one area to be a haven of refuge for the birds and for hunted wild life. Surely such creatures deserve to have some retreat that they can call a place of safety, if not a home. In this day of protecting the weak and propagating the beneficial, can we not also feel justified in lending our aid to this plan for the county haven of refuge, where no shooting, hunting or trapping is allowed to any time during the year.

In conclusion, let us urge that we lay aside all minor personal prejudice, and be willing to take harmonious part in furthering that legislation and enforcement of legislative enactment which must result in the protection of our native birds and in advancing the welfare of mankind.

Mr. President: I wish to add before leaving the floor, that while it is not exactly my subject, yet I think every member of the Board knows of the work I have done in breeding and propagating scale parasites. I have some pictures of these parasites in the lantern, and if there is time, I can show them in five minutes time. This is such a new subject, and so important, that I feel that the members of this Board should have this information first. I always feel like giving some such information to these gentlemen, who are practical farmers before I send it out to the rest of the world.

A Member: Did I understand you to recommend the protection of the turkey buzzard?

PROF. SURFACE: I did not recommend the protection of the buzzard, no, sir. While my assistant is making the connection for showing the slides, I will give a word of explanation concerning these scale parasites. About four years ago, in giving a public demonstration in the orchard of Hon. William T. Creasy, near Catawissa, I said we had found there were parasites working on the San Jose scale, which I believed would ultimately clean it up in this State. This statement is confirmed by two persons now in this audience. Since then we have been breeding the parasites. We have bred fifteen distinct species, just as distinct from each other as a hog is from a sheep or a horse from a cow. We have bred or reared them by the thousands of specimens and we have found them absolutely cleaning up the San Jose scale over a large area, which is practically the southeastern quarter of Pennsylvania.

If any gentleman wishes to go with me tomorrow to the Borough of Mechanicsburg, only three trolley fares up the Cumberland Valley, I will show him trees that have been as badly infested with the San Jose scale as any in Pennsylvania, absolutely cleaned by these parasites, and they never have been sprayed, and if he does not agree with me after having seen it, that this is the work of the parasite, I will pay his trolley fare, if not for his time. I was so impressed with the importance of this subject that I gave special attention to the breeding of these parasites, and it seems to me that the members of this Board will be interested in my reference to this subject and in the opportunity to see these pictures directly from nature, showing the different kinds of parasites we have bred.

The first slide shows, as you will see and know too well, the fruit, the leaf and the twig of the tree infested by San Jose sale. You know, my friends, that in almost every county of Pennsylvania, that was a familiar sight up to within two or three years ago. The different specimens on there are male and female; and this is another form of San Jose scale. As we commence to examine such a branch more closely, we see it is covered by the pest, completely overed, encrusted. Such a tree as that is in condition to die, if not given prompt and severe attention, both in thorough spraying and severe pruning. Under the microscope, this is what you would see, an extended representation of a bad infestation by San Jose scale. The characteristic form of the San Jose scale is there plainly shown. You see the little ring around the white tips of the scale, that tip being in the center and the dark ring around it. It is a character of that particular species that is made manifest under the misroscope and which I never have seen shown so plainly as we see it there tonight; that is just what our inspectors look for when they come into your orchards, and when they see that they know it is the San Jose scale, and not one of the 20 or 30 species that might be found there—that particular specimen is not infested with the parasite, because the scales are not bored or punctured, but we will show you now what you can find all through this region, you can scarcely find an orchard that has once had much San Jose scale in it that you don't see just that condition there. The scale has been bored by the parasite, a winged, very minute, wasp-like insect, smaller than a period in the ordinary newspaper print; even with its wings spread it would not reach over the space covered by a period. It lays its eggs in the soft body of the San Jose scale. The larva, grub or maggot feeds on the tissue of the scale and when it is through feeding, it bores through the scale and comes out as the winged insect to mate and lay its eggs in other scales. The insects that you see on that slide are the shells where these parasites have emerged, and I can show you that in almost every orchard in this and adjoining counties.

Now I will show you some of the different species of these parasites themselves. They don't have common names; this one is *ethilijus usafenus,* and that is magnified about 800 diameters. Note, as we go along, how distinct the different species are in the character of the wings, legs and other structures. This is *pospeteny lisiocia,* which is the one most abundant in this region and throughout North America. This species we have bred by the thousands and tens of thousands, and sent them into different parts of this and other States. This is *prosopeltus orantii.* I have been fortunate in capturing both the male and female specimens there; it is the second most numerous species. The picture is an unusually good representation of an insect, as good as some of the best line drawings. I wish to give proper credit to my photographer, Mr. Smith, the operator of the lantern, for the excellent work he has done.

These specimens have been bred and the slides made all right here in this building. The next is *aslurus liceocampi;* how different in texture and appearance from the others. This comes from the fact that it attacks the egg of the tent caterpillar, *liceoopan,* and it has been bred in the eggs of the tent caterpillar and also from the scale. The next is *onofraschi anafras,* so named from the fact that it feeds on the scurfas scale as well as the San Jose scale. The next is shown *aspidifagus citronus,* from the fact that it is first bred on the orange, the *citronus,* is the Latin name; but we have bred it here on the San Jose scale in this State in considerable numbers. The next specimen is known as *annigris grafilus.* It may possibly be a secondary parasite. It is not abundant in this State, in our breedings, but it is one that has come from our cages. Any person interested in seeing our breeding cages, we would be glad to show them, in the annex to the greenhouse, tomorrow. This is one of the most interesting parasites known, *signafora niger,* niger meaning black, black in appearance. This one is known as *perisoptrus poxarcanus.* It is highly colored and decorated and is a Mexican, for sure. It is one of the peculiar species we have bred from the San Jose scale, living in this region. That is the male of a scale insect closely related to the San Jose scale; it shows that one is liable to get the male insect in place of the parasite if he doesn't watch out. That also is another specimen of the male that looks exactly like the male of the San Jose scale, but it is the rose scale.

This is a species of uncertain classification which is not yet named specifically. The peculiar fact is that we see the eggs of the insect on the slide. The adult then probably dies, the larvae remains in the scale during the winter. This is another unnamed uncertain species, a species not described. The eggs are also shown. It lays its eggs in the fall of the year. This is another species of an uncertain type. It is entirely new, doubtless new to science and is vastly different from anything else I have shown you. There is a slide showing the almost complete perforation of the San Jose scale by the parasite. See those perforations in almost every scale done by the parasite. I show there an old branch and a new shoot. Note, if you please, how completely the scale covers the old branch. See the dusty or powdered appearance of it and the entire absence of the scale from the new shoot, showing that the parasite cleaned it up in one year's time; that was a tree that was never sprayed. That is the same. Note the old branches, how completely covered with scales, and the new shoots with no scale or remains of scale upon it, from a tree never sprayed, showing how the parasite cleaned that tree. Finally, I show you a specimen of a mite, a new species of mite, feeding upon the San Jose scale. That is what is commonly called a red spider, but not the ordinary species, feeding on the scale.

A Member: You spoke about the young martins raised at Norristown; some of those same birds were raised in my next door neighbor's yard and they were a great care to those people, but Mr. Chrisman went along to get the parent birds with the young in the cage; they went fourteen miles and after the old birds got away, they felt themselves responsible to rear the young, and I tell you it was a work; they fed them at first every hour and every two hours, and at last those birds, as they grew, became so tame that when they commenced to fly out if Mr. Chrisman would go out in the yard and whistle, they would light on his shoulder.

PROF SURFACE: I am very glad to have my statements verified in that manner.

The CHAIRMAN: I don't believe the reporter got the names of all those parasites, but the report is ordered filed.

PROF SURFACE: I will be glad to help him out when the time comes.

The CHAIRMAN: Thank you, Profesor. We will now hear an address by the Supt. of Public Printing and Binding, the Hon. A. Nevin Pomeroy.

Mr. Pomeroy addresed the Board as follows:

## THE PUBLICITY END OF THE STATE GOVERNMENT

By HON. A. NEVIN POMEROY, *Supt. of Public Printing and Binding*

When I received a note a short time ago from the Secretary of Agriculture asking me if I would make a few remarks at this meeting, I was at a loss to know what I could say, from my Department, that would interest agriculturists, but we all have such a high regard for the Secretary down here, that when he commands us to do anything, we feel like obeying; so I told him I would try to say something to you on the subject of the matter of the publicity end of the State Government. It has been my good fortune, I might say, as well as my honor, to hold the position that I do as Superintendent of Public Printing for about ten years. During that time the development along the line of publicity, as far as the Departments here at Harrisburg are concrned, have been remarkable. I do not believe that ten years ago there was much more done than the annual reports of the various departments, the pamphlets of laws, Smull's handbooks and a few other things. That has increased wonderfully in the last ten years, and, I think to the advantage of the State. The printing department, as you possibly know, the Superintendent of Public Printing has nothing to do, as far as the printing office itself is concerned. That is given out by contract every four years. I have been under the impression for several years past that it would be well for the State of Pennsylvania to own its own printing office, but the Constitution of the State prohibits that, and until that is changed by the vote of the people and the concurrence of the Legislature, it would be impossible to do it. I believe it would be better in many ways, especially as the work of the Department is increasing with each succeeding legislature.

You heard here this evening of the Hunters' License. When Secretary Kalbfus came down to see me to have those Hunters' Licenses printed, I went up in the air, I didn't know what to do, every Hunters' License was different, there was a different number for every one, every county was different, every number in that county was different and I did not know what to do to distinguish them. The Game Commissioner said that he felt there would be at least 250,000 to 300,000 hunters in the State of Pennsylvania. I could hardly believe that I told him that I thought that ought to be cut down, bring it down to about 150,000. So we got the 150,000 ready, and we hardly had them out until the telegrams and demands came in for more. We kept on until it got up to just about where the Game Commissioner said it would be, 250,000, so I found that he knew a great deal more about it than I did; so this time he has come in with his order which I received from him to-day, with his order for about the same number, and I think he is on the safe side.

Among the most important things that I think is being done by the Legislature is the bulletins that are being provided for by Acts of the Assembly for the various Departments, and among them especially the bulletins sent out by the agricultural department. Now I happen to be somewhat of a farmer myself and I read those bulletins with a great deal of interest, and I have my farmer read them, he goes over them very carefully and I am sure they have been of infinite benefit to him and to me, and you know they would be to every farmer in the State. All that work is for the best interest of the people, and while it increases the expense of the printing of the State, at the same time the people are all being benefitted by it so that the State is doing a great work in the publicity end. I used to be a newspaper reporter just like my friends here. I have been a journalist for about thirty-five years. These young men may not know anything about it, but some of the older men will recall it, what a time we used to have in the newspaper business. There would be a wreck on the railroad and we couldn't get any information at all. We would go to the officials, "Nothing to give out." They wanted to suppress everything, didn't want the newspapers to get it. How is it to-day? They have got their publicity men, everything is given out as rapidly as they get it over the wires. These young men will bear me out on that; they can get most any information with reference to a wreck down here on the Pennsylvania, the Cumberland Valley or the Reading Road. If it occurs, it is given to them willingly by the officials of the railroad. All the larger corporations are going into that, to educate the people along these lines, and that is what the State is doing.

There has been some criticism about the expense of printing, but I want to say for every gentleman, every head of a Department on the Hill here, they have exercised a great deal of care and precaution, and they come to me and we have gone over the matter before they have decided to have certain things done, as to the cost of those things; everything has been taken into consideration. I want to say for every head of a Department in this building, that they have been exceedingly careful.

Another matter that has increased our printing somewhat is the large number of foreigners we have in this State. We meet every two years, our Legislature, to pass laws. The English language is as much Greek to those people as Greek would be to a large majority of us, I guess. They have got to be given certain laws in their own languages. Those laws all have to be prepared in the Hungarian, Slavic, Luthanian and other languages, fifteen or sixteeen of them I think we have over there, they have got to be interpreted and printed in their language. We take the interpreter's copy and print it as he gives it to us. We don't know whether it is right or wrong, but up to the present time we haven't heard of any of them being wrong, so the interpreters have evidently given us the right sort of copy for it.

So these various things, as I say, are helping along in publicity. We are giving to the people of Pennsylvania one of the most important things, that possibly would interest you more than that, and that is the question of paper to-day. The paper that is made today, the large amount of it, is not going to last, in my opinion, twenty-five years. The State of Pennsylvania is making records here that are invaluable. All the records in these various Departments here have to be preserved. If they are not, they amount to very little. Unless we can get paper for them that will not disintegrate, go to dust, those records will all have to be re-copied inside of twenty-five years. We have, within the past two or three years, to overcome that, adopted this plan, that the paper for the records of the State that are to be preserved, the best paper must pass a certain test. When the bidders submit their samples and give their bids for paper—we make them submit a sample with the bid—that sample is sent off to Boston to Arthur D. Little, who is supposed to be and I guess is the greatest paper chemist in the world. He gives us his analysis on that paper. If the sample is not up to the requirements, we reject it; if it is, we accept it. In that way we are trying to get paper to put into the records containing at least ninety per cent. of rag, and that is difficult to get.

The paper business is now the twenty-first in the matter of manufactured products in the United States. It amounted last year to over $300,000,000. You can see what an immense amount of paper is being manufactured, and it is very difficult to get the rags, so they resort to substitutes. The substitutes used largely has been wood pulp. Now they are up against a proposition on that question: the wood is being taken rapidly from off our land, especially the kind of wood, pine and fir, used in the manufacture of paper, and they have resorted to a number of other substitutes instead of wood. They have not been able, up to the present time, to find anything that they can take the fibre out and manufacture paper cheap enough to equal wood, and they have got to get a substitute for it, or the price of paper is going up.

Now that matter has interested a great many scientists for quite a while. Our friend, Mr. Montgomery, of the Library, saw this matter coming a few years ago and wrote to nearly all the newspapers, in fact all the newspapers in the State that send him their papers for the State Library, to be placed on file there, asking them to give him a copy on linen or some other material that will keep. The newspapers that are going into his library to-day, unless he is getting linen papers for his copies, are not going to last. I have that experience in my own newspapers to-day, where the papers are decaying. I happen to have a paper that is over a hundred years old. The older paper used back years ago is better than to-day, but the paper made within the last twenty-five years is not.

I am not going to take up much of your time, because Mr. Montgomery is here to follow me, and if he doen't get two hours for a speech, he isn't happy; but before I close I want to read you a little extract I have taken from a recent copy of the Scientific American on this subject:

> "Each succeeding year finds new uses to which this valuable material may be put, with the result that each year recently has witnessed a slight increase in the price. The chief source of pulp for common grades of paper at the present time is the wood of certain pine, spruce and fir trees. With an increase in consumption and a limited supply, there can be but one result—in a few decades the supply will be exhausted. This being recognized by scientific men, they are now making thorough investigation to find a suitable substitute. The man who devises new processes and machinery that will make the paper manufacturer independent of the wood pulp supply, will find a great pecuniary reward awaiting his success."

Here is where the agriculturalist may come in for an increased earning power on the farm. A material that will meet the requirements must contain a fibre that will interlock and cohere in a homogeneous sheet. There are many vegetable substances that will meet this requirement, but so far the work of extracting the fibre has been too expensive. Numerous attempts have been made to employ vegetable bi-products such as sugar cane stock, sugar beet pulp, etc., but until these can be made into paper at a price less than three cents per pound there will be no immediate hope of commercial success. About forty years ago, before wood pulp was introduced, straw was largely used to supply the fibre. This material was abandoned to a considerable extent at that time because it was found possible to manufacture the cheaper grades of paper from wood pulp. In recent years, however, considerable straw has again been used. It is now possible that the manufacturing of paper from straw will again be revived and this industry given a new impetus. A German professor has recently patented a process for obtaining proper ingredients from the refuse of canning factories, especially pea and bean straw and the straw and trimmings from asparagus. This German professor predicts that lucrative industries will be established by the co-operation of growers and canning factories. A recent scientific writer in referring to the discovery by the already mentioned German professor of the pea, bean and asparagus fibre for the manufacture of paper, suggests the advisability of applying the same process to other material which is now of little or no value—for example the fallen leaves of deciduous trees. The toughness of the fibre is proved by the fact that the skeletons of the leaves do not decay until late in the winter.

A number of efforts have been made to extract and use for paper manufacturing the fibre of the Southern pine, which grows in abundance in the southern part of our country and which would supply the world with the cheaper grade of paper for years, but the wood has been found to be too resinous, making is too difficult and expensive to digest the fibre by any of the well known methods. In Louisiana recently a mill was established to make paper from saw mill shavings, but so far nothing has been attempted but a heavy wrapping paper, in the manufacture of which the mill is meeting with some success. One inventor has devised a process for utilizing the fibre from banana stems, tobacco, hemp and sea grass and several other inventors have suggested processes for extracting fibres from peat. But the laws of economics are as inflexible as the laws of nature and until the price of northern wood pulp rises to a higher figure than at present, these processes must wait for commercial development, serving meanwhile little more than reserve processes. The Pennsylvania farmer, however, has solved many a problem and may it not be possible that he may yet be able to produce upon his land the much needed substitute for the northern wood pulp that seems to be so rapidly disappearing through the devastation of our forests.

The CHAIRMAN: This address will be filed with the Secretary, as the others. We will now hear the address of Hon. Thomas L. Montgomery, State Librarian.

Mr. Montgomery spoke as follows:

## THE BOOK AND THE FARM

By HON. THOMAS L. MONTGOMERY, *State Librarian*

Mr. Chairman, Ladies and Gentlemen: As I listened to the burning words of farmer Pomeroy, a few minutes ago, my heart glowed with joy because I, too, was a farmer. I had no idea that Mr. Pomeroy was; I thought George Hutchison and myself were the only members of the Old Guard who had anything to do with the farming interests of the State; and I was not a real farmer, I was rather an agrarian, a gentleman who supports a farm in the country by having a well paid position in the city.

Mr. Pomeroy's remarks with regard to this question of paper, deserve some notice from me. I did send notices to all the papers asking them to produce one copy at least on linen paper for preservation in the Library. About twenty-five publishers are now furnishing me with papers of this kind, so we will have a partial record of what has gone on the past, in these records, instead of having simply a mass of disintegrating pulp, as I call it, which will be the resultant of the wood paper. In these days of physical, moral and mental unrest, it is well for every community that they should possess a collection of books. The child finds himself vocationalized very early in life; the young man becomes a master of arts without knowing anything about the classics; the average child gets no training beyond the age of fourteen years, and if the child is, as it is supposed he is, the father of the man, it is just as well that he should have some quiet place to which he can resort and settle his family affairs in the presence of the records of the great people of the past and with the literature around him, the best literature of the present. This principle has been adopted in cities and towns throughout the country, and the fact that one hundred and forty free libraries have been established in Pennsylvania within twenty-five years, and that each year produces several converts proves that the idea of a people's university is not only right theoretically, but that practical difficulties have been eliminated, for no free public library ever fails.

The situation in the towns having been disposed of, the missionaries of the library movement immediately took up the question. But what of the open country? The various State governments appointed commissions to consider the advisability of bringing the book to the individual where the individual cannot conveniently take himself to the book. The State of Wisconsin was a pioneer in this work. But the idea is not wholly new, for in Governor Pennypacker's "Annals of Phoenixville," there is an account of the Charlestown Library, which distributed books in the eastern part of Chester county in 1812, and there was a similar institution circulating from corner stores in 1798. Dr. Sharpless of Haverford College tells of a Charlestown Library in Chester county from 1800 to 1850. In Wisconsin, however, the movement had the backing of the State. and the State organizers took advantage of every means of transportation to carry the message of free books to every hamlet in the sparsely settled districts. In Pennsylvania the work was authorized by Legislature, without an appropriation, in 1899, and six hundred little libraries of fifty volumes each, have been travelling over the State ever since. We send them to the study clubs, to places of three or four hundred inhabitants and out into the cross roads and by-ways and they may be obtained upon the application of any twelve citizens in any part of the State.

We have not reached the point where we have ever made a pin scratch upon the surface of what can be done. There is no question about it, this is a great work. It is not a new idea. Way back in 1800, there was a similar movement, as I just stated; but no effort of this sort can simply be pushed by us, the desire for literature must come from the people in the rural districts. Whether you talk about rural uplift or anything else, anything of the kind must come from the people themselves and they must appreciate the opportunity afforded to them, and if they do not take an interest in it, if it does not touch them internally, the effort is largely negatived. We are doing our best to reach these people in the rural communities, doing our very best to see who wants something which is worth while and it is our desire to furnish it to you. We are spreading this work gradually, because, as a matter of fact our appropriation would not allow of every community in the State of Pennsylvania coming to us at one time; but there are some four hundred that are doing that now and we want to gradually increase that.

We have, under contemplation, a plan whereby we can utilize the country school house, possibly as one of the centers of distribution. Sometimes we send these books to a store and sometimes to a post office, sometimes to a private house. Somebody has to be responsible, of course, for the care of the book, but it is our desire that nobody in the State of Pennsylvania shall need anything in a book that cannot be immediately forwarded to them. If it is the case of an individual, the request can be addressed to me and the State Library will furnish any book to any particular citizen of this State. When the need is that of the community itself, through these travelling libraries, we will send the best literature to any people that need it. There has been going on in Delaware a search of what books are needed by people in the rural communities. Usually they read better literature than those in the towns, they take the real thing rather than the trifling thing. In Delaware the commission sent out a certain list of questions, "What books have you in your house?" The school children were asked this question and they brought back the answer from their parents, and ninety per cent. of them answered the questions as a whole, and the first question they answered by saying that they had, always, every one of them, the Bible. When it came to other things, one of them reported boastfully that the catalogue of Sears, Roebuck & Company, of Chicago, was the only bit of printed matter in the house. There were quite a number in one county, forty per cent. who reported that they didnt' read anything.

Now, this is a cracker district. You no doubt know the story of the Georgia cracker. He is a gentleman that doesn't do any work unless he has to, and on one occasion a Northern man went down and asked what a cracker was. They told him, "You see that black object over in the third field?" "Yes." "Well, that's either a cracker or a stump. You stay here two hours and if that object moves, it's a stump." The people of lower Delaware are very much like the crackers of Georgia, they do very little, but nevertheless that is a high percentage, that forty per cent. don't read anything at all. I do not believe those conditions exist here at all. We have not made an actual canvass of this State, but we do wish to spread this work and spread it logically and do it well, and I feel that unquestionably we have begun along the right lines. It is not possible to do everything within a few years on a small amount of money, but I wish all of you people would go out and tell the communities in which you live of this travelling library system being in existence, ask them to try it and criticize it and tell us where we are lax. If we are not supplying the right kind of literature tell us where that is the case.

I have only one word further to say to you to-night and that is with reference to the lantern slides, which we have developed, in connection with the State Museum that is also under my care. We circulated during the last six months about 50,000 lantern slides. These are colored lantern slides on every conceivable subject. There must be occasions on which these would be useful to each one of you in talking in your communities. You can have these beautifully colored lantern slides under the same conditions that you get the collections of books, and when I tell you that 50,000 of these have been sent out during the last six months, you can imagine they are being appreciated to a considerable extent. Each slide has been out four times in that period.

MR. HUTCHISON: Do you furnish the lantern?

MR. MONTGOMERY: That is the point I am coming to. I hope to have a cheap lantern that can go with these slides. We have not been able yet to get one that is quite what we want; but in extreme cases we would even furnish the lantern, when it comes to the question of something along the line of instruction. When books of mere amusement are to be considered, that is one thing, but we don't want anybody to miss the opportunity of giving instruction or receiving it, if it is in our power to help that cause along, and I hope that in both these lines you will spread the good story as far as you can and let the people come to us and try us. If we fail, that is our fault, but I don't think we will.

MR. HUTCHISON: I would like to know how many persons here have made use of these travelling libraries. We have been getting it for five or six years in our little village, our country people and town people are reading it and you would be surprised how much there is in it and it can be had just for the asking.

MRS. FOULKE: May I say one word about those travelling libraries? It has been my good fortune to have an address and in that address I have spoken of these libraries. I went to see Mr. Montgomery and he told me about them several years ago and I have carried that news all over this State wherever I have been sent, and I have never been at any place where I have not been surrounded by crowds of men and women anxious to know about it, and especially the little boys, hundreds of them, will come to me and ask me about this library. Tomorrow night I will speak again of a special library I have had and the way it has affected the men and women all over this State, and especially in the matter of domestic science. They all seem anxious to read them.

SECRETARY CRITCHFIELD: I want to talk about a minute or possibly a minute and half before we adjourn—possibly two minutes but not beyond that. First of all, I want to say that Dr. Kalbfus, who delivered the very forcible and excellent address here this afternoon on the subject of bird protection, has a number of bulletins here with pictures of bird homes that can be erected on the farm; they are right here and anyone who wishes one of them can come and get one before they go out. What I wanted to say particularly is this. I think you have all heard already how important it was that we should ask the different departments of our State Government to come in here and assist us in this meeting so that we will get closer together and come to an understanding of what is being done by all these Departments. In order that we may have this understanding, it has been necessary to make our program a little larger than usual, and when I came to take up this program, I scarcely knew what to do. My first thought was that I would ask the Board, at the very first session, to adopt the program. You see that I have provided for a little less than three days. We have found that we have been able to get through with today's work by extending the work up to ten o'clock to-night. Now I want you to think over the matter tonight, and, if, to-morrow morning, you have reached the conclusion that it would be better to amend the remaining part of the program and extend our time on to Thursday afternoon and Friday forenoon, even Friday afternoon and Friday night, let there be a proposition to amend the program to-morrow morning, so that this will all be for your consideration, if you think it will do better. My thought was that if we could get through by Friday noon, you could have an opportunity to look around the Capitol, visit some of the Departments and have a little social intercourse with each other before you go home. Many of you perhaps will not start home until Saturday morning. Think this over and have your minds made up as to what you want to do, whether we will extend the time or undertake to complete the program just as it is.

MR. YOUNG: It appears to be important that the Executive Committee take up the work that will be assigned to them. Will it suit to meet in the morning at your office, Mr. Secretary?

SECRETARY CRITCHFIELD: Certainly.

MR. YOUNG: Then the Executive Committee will meet at nine o'clock at the office of the Secretary.

MR. BLISS: It is my pleasure to be associated with Mr. Montgomery in connection with this travelling library work, and that particular kind of work is directly under my control, and I want to say to those of you who are here and who are or have been getting travelling libraries, that we would be very glad to have you come over and call on us and we will show you how to do the work and show you our collection of books that we draw on for this purpose, and give you any information we possibly can. I will be glad to get any suggestions or information from you that you can give us that will help us in carrying on this work and enable us to make it more profitable and attractive to the people who live in your district.

MR. HUTCHISON: We are up to date this evening. Mr. Foust was not present, but Dr. Kalbfus came in and took that number, and if we keep right at the work to-morrow, I don't see why we cannot carry the program right along, if everybody is prepared to go to work. Of course we have some reports to make. That road question is going to be a warm one, I presume, getting it all threshed out and the roads all built all over this Commonwealth, 8,800 miles of road to build to-morrow—devise the ways and means to do it; it may take some time, but if we meet promptly and keep working right along, I don't see why we cannot work this program up, Mr. Secretary.

SECRETARY CRITCHFIELD: I think that is quite possible, but you will observe that there has been very little discussion, we have not had the time for it; notwithstanding the fact that notice was given that the Specialists and Chairmen of Standing Committees were expected to confine their reports to fifteen minutes, some of them have gone half an hour and sometimes a little over that. That is a matter over which the Secretary has no control; we simply make

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the request that was made by resolution some time ago, and we don't like to have a good report cut right off; I wouldn't like to get up and say "Now that gentleman will have to stop, his time is up." If you are willing to go on without any discussion, just as we have gone on so far, I think we can get through in the time that is provided by the program. I want you to think it over; I don't want to have all this responsibility on my own hands.

The CHAIRMAN: If there is no other business before the Board, the convention stands adjourned until nine thirty to-morrow morning.

Thursday, January 29, 9.30 A. M.

Vice President Killam in the Chair.

The CHAIRMAN: The meeting will please come to order. The first speaker on the program this morning is Dr. M. E. Conard.

Doctor Conard submitted the following:

## LIVESTOCK

By DR. M. E. CONARD, *Westgrove, Pa.*

In discussing this livestock question in Pennsylvania, I always feel a little bit at a loss because we are not in a real stock-raising State; we cannot rank as one, although we do raise some stock and should raise more. It is not altogether a matter of numbers and statistics that give us a tab on the condition of the livestock in the State, but it is the use that we are making of it, it is the way we care for it, the way we breed it and select it in order to make it most profitable to the farming interests. I say we are not a stock-raising State because we have such diversified interests. We have probably the best markets in the United States right in Pennsylvania. Those markets have been supplied very largely from outside of our own borders, particularly with animal foods.

Time is changing a little some of the sources from which we receive our butter and meat and the like, now they find other markets nearer home. The Western land has become higher in price and it brings us more nearly on a level with the Western country so far as cost of material is concerned and profit in raising it, than we were in the past. Since a great deal of our land has lost its timber, we find that we have a little more pasture land and, with the increased markets, some increased facilities, decidedly increased population, it is time for us to look about and see what is the matter and study how we can better use our livestock to our interest. We are the third dairy state in the Union, though not the third stock-raising state in the Union. The dairy interests are being drawn on pretty heavily in Pennsylvania. Of late years, or of late months, more properly speaking, New York City has penetrated Pennsylvania almost from end to end in quest of milk. It is only a short time since the Pennsylvania Railroad would not consider hauling milk a distance greater than seventy miles; whereas, now they are co-operating with the large dealers in the cities, soliciting the hauling of milk. They are going into the northern part of the State, into Bradford and adjacent counties, and soliciting the hauling of that milk by way of Harrisburg and Philadelphia to Brooklyn, under the City of New York, and never unload it until it is in the City of Brooklyn. The railroad company has been calling meetings of farmers, some of you may have been there or may know about it, no doubt you do, and introducing New York dealers to them, saying to them that we want to haul your milk. The dealer says, "We want to buy it from you," offering them a market. They are also doing the same thing in Bedford county, I understand. The Pennsylvania Railroad is hauling milk from Titusville to Philadelphia, from a plant out there owned by a Philadelphia party; so you see it is bound to become better than the third dairy state in the Union very soon, with those markets.

Now, if we take advantage of those conditions, select and breed our livestock in accordance with the market, there is a great field in front of us and not very far away. There was a time, a few years ago, a few decades ago, when the ranchman was doing business at its height in the west and the population of Pennsylvania was not increasing. Land was very cheap in the west and we got a great deal of our livestock there, and there was, for about ten or twenty years in the last century, a period when the number of livestock decreased in Pennsylvania. Since the lumber has been pretty well consumed and other industries have spring up in its wake calling for innumerable numbers of hungry, hardworking men, and our land does not stand up to the previous prices that we got just after war times, the western land is probably higher priced than ours now, it becomes necesary that we get the greater part of the feed for these people closer to home; so this very movement that the New York people and Pennsylvania Railroad people are making shows us that it is not in the future, but it is here, and we find ourselves now with a rather decreased number of cows over what we had in 1900, probably two or three hundred thousand less dairy cows, in the State of Pennsylvania than we had in 1900. I am glad to say that the efficiency of the cows is probably not lessened; I believe it is rather increased. The decrease is no doubt due to increased demand for animal food, meat, veal, beef and the like. That demand has made the prices high. The prices were very tempting to the dairyman to thin out his dairy, sell off such cows as were not most profitable and were ready for the butcher, and sell off all of his calves, at the same time depleting very decidedly the dairy stock of the State.

Now we find that we have about 993,640 cows in Pennsylvania and I am not going to give you a great deal of figures to remember, but what I want to do and I hope I can do it, is to draw a few comparisons of the present conditions with the past and what will be necessary in the future, so as to make us think a little more intelligently about our business. But we have 993,640 cows. They are reported on about eighty-eight per cent. of the farms; eighty-seven and one-half per cent. of the farms report dairy cattle. Now, from those cows there is slaughtered every year 538,519 calves. Suppose the average dairy will produce eighty per cent. of their number in calves each year; I don't think they will do more, considering the loss and the many difficulties that we meet within breeding dairy cows. If that is true, we would have about 746,812 calves every year. Now if there's 538,509 calves destroyed every year, it leaves rather a small margin to replenish our dairies, considering that less than fifty per cent. of the calves raised ever proved themselves profitable dairy cows. It would leave us less than 200,000 calves to be raised every year in the State of Pennsylvania. Now then, allowing fifty per cent. of them to fall by the wayside or rather to not mature into good, useful dairy cows, we don't have more than 100,000 calves to depend on to replenish our dairy, 100,000 calves every year, 993,000 animals, would make it necessary for a cow to be useful for ten years in order that the calves could keep up the supply to where it is now, to say nothing of the increase.

That is a condition showing that we don't raise anything like enough cows to keep up the dairy stock to its present status to say nothing of taking care of the necessary and inevitable increase that we must meet. The question comes, "How are we going to do it?" The way we do it is to go out and buy them, and you know, most of you know the rest of the story. We sometimes get those that are satisfactory and we sometimes do not. In the State of Pennsylvania there are 457,192 beeves killed every year. They don't cut any figure in the raising of stock here, because they are generally feeders that have been brought in from other sections; but there are cattle reported on eighty-eight per cent. of all the farms in the State; there are dairy cattle reported on eighty-seven and one-half per cent. of all the farms in the State; there is only a half of one per cent. of the farms in the State on which there are no dairy cattle.

Now that rather indicates that the beef business is a side issue. and it is, very frequently. Many farms have small dairies and feed a bunch of cattle as well, and in some parts of the State, maybe all parts of the State the last year or so, of which we have no statistics, the beef business has increased very largely on account of the scarcity of good dairy help, and the high price of beef has rather tempted people to put on a good many beef cattle.

Now those are just some conditions that I think, if we'd just study them out and see where we are, just see where we stand in the dairy business in relation to the demand that we are already into and a greater demand that is facing us, I think it would make it necessary that we get busy and try to increase our dairy stock. Yet the average Pennsylvania farmer is more extravagant and more wasteful with his stock than he is with anything else on the farm. Why, the livestock is the thing on the farm. There is nothing so important on the farm as livestock, next to the farm itself. They are machines, they are what we use to manufacture human food out of our rough product; and without it, the farm is no account as a farm. We can neither do the work, neither can we prepare the food for human consumption without livestock, and yet I think the livestock is subject to more neglect, to more, if I may use the term, more fool notions on the part of the owners and managers of the farm than anything else that we have under our control. We are very neglectful of the calves that are born. We do not see that they are properly born or properly bred. We do not see that they have the proper ancestors. Now if we are facing a dairy market, and we've got to meet it, it is necessary that we should produce dairy cattle. Don't get the idea that you can get the whole thing in one. I don't mean beef cattle and dairy cattle, but I mean dairy cattle. I don't care what kind of dairy cattle you grow, but cattle that are dairy cattle. and select the ones that are best adapted to your locality, your market and your individual tastes. There are a number of dairy breeds and they are all good enough if they are properly handled, and they are all made by certain methods of breeding and selecting with a definite object in view, and the result is that the individuals have in them some certain strong characteristics, either the production of a large quantity of milk, or a large quantity of butter or possibly both, or they may be beef animals. Select the kind that suits your market, suits your individual taste and suits the environment where they are to live. You want to remember that something has made those cows what they are and it was not done in one generation. You want to remember that the Jersey cow was not made a Jersey cow in one generation; she is not a chance animal; she is the result of five or six hundred years of steady, careful selection and breeding for a definite purpose, under certain conditions that favored the development as we find it. Now we bring her out of those conditions and we give her an entirely different environment, different care, maybe different feed, and we cannot expect her to continue to be just a Jersey cow as she was before. The last artificial acquirement is the first one to leave off. I want you to get that; the dairy cow is artificial, she is the result of man's ingenuity, work and selection, and the extreme dairy characteristics that she possesses are artificial. Nature never gave us a dairy cow; we made her out of the crude material, and the artificial requirements are the first ones to lop off or leave off when she ceases to get the conditions and care that put them there.

In selecting a breed, look up the history of that breed, acquaint yourselves in some way with the conditions under which they live, the conditions that made them so, continue those conditions as nearly as you possibly can. They will acclimate to a certain extent; of course you cannot duplicate the conditions absolutely, but we want to imitate or reproduce as nearly as possible the conditions that brought them to where they are. So there is where we make a mistake in not breeding for a definite purpose. We say we will have a few Holstein cows, but the dealer does not like that milk, it is a little thin, and we will put some Jerseys in along with them, and here is a row of cattle, maybe half a dozen Holsteins and three or four Jerseys, all in the same stable. They don't fit the stable, they don't fit the conditions, you can't hire a man to feed those cattle of different sizes intelligently; you may do it yourself, but you cannot hire it done correctly. It is necessary that you observe uniformity and that naturally will follow if you select a type, a breed, and follow it up. I don't mean to keep pure breeds, but breed high grade, breed along that line and continue the same line. We don't give our cows good homes to live in. There are some good barns in Pennsylvania, of course, and they are not the ones I refer to, but I do refer to the large percentage of barns in the State of Pennsylvania as not being fit places to keep animals at all, and much less are they fit places to handle the most delicate food that we use, the most important food that we use. They are dark, they are dirty, they are damp and they are not well ventilated. Now that applies to nine tenths of the barns in Pennsylvania. What we want is better ventilation, better light. Light will do a great deal toward purifying the barn. You want the stable so constructed that it will not interfere with the sun's rays striking the floor. If we can line free access to the sunshine into the barns so that the floors will get a sunbath every day, and then reasonably good ventilation, much of the question is solved. The floors should be hard, some kind of hard, impenetratible material, so that liquid will not soak into the floor, and then it an be absorbed with litter and all taken out together. It will pay for the cost by the improvement it makes in the quantity of the manure; it will pay for it in the safety it gives to the product you handle—food; it will pay for it in the improved quality and condition of the atmosphere the cows breathe. You imagine a string of cows in a stable, twenty or thirty or forty poorly ventilated, breathing bad air all the time, and that means that there is an improper amount of oxygen in that air, a limited amount of oxygen, a surplus of carbonic acid gas and other gases going into that cow's lungs every minute of the day; do you think they could resist tuberculosis if it comes along, under those conditions? She is the hardest worked animal on the farm, she works 365 days in the year and twenty-four hours in the day; she is either producing you food or producing you offspring, and she needs the very best air, food and care she can get, if she is going to do her best work, if she is going to be efficient. Disease is spread very largely by traffic. There is no reason why any farmer who will go at it intelligently, cannot establish and maintain a perfectly tuberculosis free herd, if he follows the thing up closely, breeds the cattle on the farm, keeps them from intermingling with other cattle that are diseased, gives them a good, healthy, comfortable place to live and the proper amount of food, he can keep out tuberculosis. It has to come from the seed; it cannot come without it. If the seed is kept out the disease is not there. Dr. Marshall told us yesterday that this State suffered a loss of $5,000,000 annually from preventable diseases amongst the livestock. Now he says "Preventable diseases," that means diseases that can be prevented and should be; if they can be, they should be. Let us see what that means; $5,000,000 annually. The nine hundred and ninety-three thousand and some odd cows that are in Pennsylvania to-day are valued at a little over $35,000,000; suppose it were just $35,000,000, and we lost one-seventh of those cows every year from preventable disease. It was not confined to cows in his case, but we do lose it, due to some kind of mismanagement. If those diseases are preventable, they should be prevented. If we lose what is equal to one-seventh of all our dairy cows every year, in every seven years we would lose them all.

How would you like to think that in every seven years we would lose all of our dairy cows? Nothing between; everything went all right for six years, but the seventh year they would all die; that would set us to thinking, wouldn't it? We would get busy; I think this Board would pass resolutions before night to have something done. But the same thing is going on right here under our noses and we are tolerating it, we are not only tolerating it but contributing to it right along, simply because we do not study intelligently the proper care and treatment of our stock.

The horse industry in this State is a pretty important industry. Have you any idea how it stands and what we are doing in the horse business? We have 511,812 horses on farms in Pennsylvania. That means about 2½ horses to the farm, including colts. Of horses that are not on farms there are 227,350. There is about half as many not on farms as there is on farms, so every farmer has a sale right along for just half of his horses if he has the right kind at good prices. Now, to meet that demand in 1909 there were 30,981 colts raised in Pennsylvania, yearlings. Now, without asking you to remember too much, that would require every horse on the farms only, and not in town, to live seventeen years, work seventeen years, in order that many colts every year would keep up the supply on the farms. Now, we have a market for 227,350 horses outside of that. Now we are keeping up the supply of horses on the farm, we are not beginning to do it. And then we go out and buy the rest of these horses at anywhere from sixteen to twenty-five cents a pound. We raise milk at about a cent and a half a pound or a little more, a cent and a half or two cents a pound, to pay for it with. If we raise beef we give three pounds of beef for a pound of horseflesh. If we raise pork, we give two and a half or three pounds of pork for a pound of horseflesh. If we raise wheat, we give one bushel of wheat for about four pounds of horseflesh; it is the highest priced flesh on the farm. We have just as good conditions to raise it under here, as they have in the west. We have not done it because we were not educated to it, our fathers didn't do it, but people who were stock people in this State were tempted by the Western lands. This country was depleted of its stock raising people by the Western country offering them better fields, in the past. If we will study it up and get the right kind of horses, there is a fine chance for a very good market.

Swine are reported on about 65 per cent. of all the farms in Pennsylvania; that averages about 7 hogs per farm. The milk industry is rapidly pressing back the hogs, displacing them to a certain extent, because when the milk is sold, it is not easy to raise them. There are quite a number of people in Pennsylvania who are trying to raise hogs on alfalfa, without milk. I cannot report just what progress they are making, but that is a movement that is being worked out now, a plan that is being worked on, and I hope that we will have something good to report in the future on that line. Alfalfa seems to be a specially good feed for hogs, and where they can be pasturized it may result in being a profitable way of raising them without milk.

MR. FENSTERMAKER: Will you allow any questions on this paper now, Mr. Chairman?

The CHAIRMAN: I think we will take that up a little later and get along with this program as far as we can. There is a great deal on the program for this forenoon. We called this meeting to order when there were not as many present as now, and I think it would be a good idea to call the roll.

(The roll was called).

The CHAIRMAN: Now, gentlemen, we will proceed to the next subject on our program, which is Poultry, by Mr. Wittman, of Allentown. I wish to announce, however, that this Roads Committee, consisting of myself, Mr. De Witt, Mr. Rodgers, Mr. Fenstermaker and Mr. Blyholder, will meet at eleven o'clock instead of this afternoon at two o'clock; we will meet at eleven o'clock this morning at the office of the State Highway Commissioner.

Mr. Wittman presented the following report:

## REPORT OF COMMITTEE ON POULTRY

By W. THEO. WITTMAN, *Allentown, Pa.*

Poultry conditions and poultry markets have been highly satisfactory throughout Pennsylvania this last year. I am more than sorry that my report this morning is on paper; I wish, instead, that I could take this Board out and just let them have a glimpse, through the medium of their eyes, at the poultry industry as it looks today; I think it would be very much more satisfactory. There is more poultry than ever; the prices for both eggs and market poultry are not only steadily on the increase, but have been exceptionally high the past twelve months. Producers or growers have received this last year (Nov., 1913,) as high as 67c and 70 per dozen for their eggs and 24c to 28c a pound for their market poultry. A 60c price for eggs and an eighteen cent price per pound for poultry has not been uncommon. Such prices and the insistent demand for eggs and poultry at these prices has naturally added a great stimulus to the already great interest in poultry growing and it is a safe guess that more people than ever will take up poultry farming this coming year. That the dissemination of a knowledge of improved or better methods of poultry breeding, poultry housing and poultry feeding is bearing abundant fruit, is proven by the fact that this year again the prices of eggs broke immediately after the Christmas holidays, or, in other words, this year's experience was a repetition of the last few years in that eggs brought the high prices in October, November and December and that probably the former high water mark prices of January and February eggs are gone forever.

This passing means that, as a result of this knowledge of a better breeding, feeding and keeping, hens are laying earlier in the year or winter. Also, improved knowledge and methods are responsible for a great increase in the number of successful and permanent poultry farms in the State and although there must be ten such where there was one a few years ago, a much smaller per cent fail and go under. There has also been a great deal of breeding going on for increasing egg production and Pennsylvania as a State has been exceedingly fortunate in having had moved within tis territory this last year its first egg laying contest:—that conducted by the Philadelphia North

American, at Thorndale, Chester county. Also, in having certain parties in Lancaster county buying and bringing into the State ten birds that won in the late Missouri Egg-Laying Contest and parties in Monroe county bringing in the second prize hen in the Connecticut contest. These birds were bought strictly on their merits as layers and cost very large sums of money and yet were probably worth all they cost as such stock cannot help but greatly aid Pennsylvania growers in their efforts to upbuild large flocks of heavy layers.

The State has now some 80 organized Poultry Associations and holds annually over 100 poultry shows of merit. The agitation for a law for this State requiring inspection of poultry and poultry products is being carried on more vigorously than ever and it is to be hoped that such law may seen be a fact.

In this connection, abstracts from an article printed in a late issue of the Rural New Yorker and endorsed by the Editor of same, may be of interest. This article was by Dr. Robert Meade Smith (of Gwynedd, this State) late of the University of Pennsylvania: "On page 785 you print without comment a letter signed 'M. B. D.,' which deals with the marketing of infertile eggs as a 'bunco game' and if the opportunity offers, advising the egg producer to work it and work it hard." I wish to take exception to this and on the contrary, with many others, I believe that the marketing of any but nonfertile eggs should be prohibited by law. An infertile egg produced under sanitary conditions and protected from external infection is a stable, organic, chemical compound, capable of withstanding prolonged high temperatures. A fertilized egg, after exposure to a temperature even below that of inoculation, is a living animal organism as long as germination continues. The germ feeds first on the albumen and consumes that; the yolk or yellow is only absorbed about the twentieth day, and if it could rot or putrify or spoil, we would never have any little chickens; if anything rots in the egg, it is the germ or embryo itself and we have had a false notion of what constitutes a rotten egg. When the germ dies, as die it must when the temperature is reduced or when handled in transportation, the egg then becomes dead animal tissue and as such inevitably undergoes putrefaction when it temperature is again raised.

Until the compulsory inspection of poultry plants is compelled by law, which will be coincident with the prohibition of the sale of infertile eggs, egg producers, for their own interests, apart entirely from the criminality of distributing one of our most important foods, sure sooner or later, to become unfit for use, should be encouraged to produce only nonfertile eggs. No one claims that nonfertility is a guarantee of a perfect egg, but it is one of the most important factors; but, mere freshness is no guarantee whatever as to the quality of a table egg. Eggs laid in the manure pile or in the stable by hens fed on garbage and living and wading in all sorts of filth, even when new laid, are not fit to eat and, when you add to this, that the eggs may have been exposed to excessive or incubation heat and have been partly incubated, all conditions have been greatly aggravated when, in addition, the eggs were fertile to start with.

I would like to strongly impress upon this Board, and through it, the farmers of this State, that the first and easiest way to improve the quality of our market eggs and at the same time save to the people of the State millions of dollars' worth of eggs now annually thrown away as unfit for food, is to shut up all male birds and to keep them shut up, or better yet, caponize them or kill them when no more than two to three months old, and, in their place, secure good breeding males, bred for the particular purpose the flock is being kept for, and then handle such males as all good breeding males should be handled. Outside of this continued experiments have proved that pullets will show and develop better, that hens will lay better, will live longer, be in better plumage and be better content in the absence of the male. Finally, while some people are still knocking the poultry industry and worse, with the prices of this last year and the indisputable evidence that more and more people are making good as poultry keepers, this will eventually have to disappear.

The CHAIRMAN: Gentlemen, you have heard the reading of that very good paper on poultry and I hope the subject will be taken up for some discussion later, though we hardly have the time now. The paper will be received and placed on file. I will now ask to be excused.

Vice President Wilson took the Chair.

The CHAIRMAN: Next on the program is "Police Protection to Rural Districts," by Captain Groome.

Captain Groome then presented the following paper:

## POLICE PROTECTION TO RURAL DISTRICTS

By **CAPTAIN JOHN C. GROOME**, *Superintendent of State Police*

I felt very much honored when I was asked by your distinguished Secretary, Mr. Critchfield, to address you today on "Police Protection to Rural Districts." There are so many reasons why the rural districts should have proper police protection and so many benefits the rural communities would derive from a sufficiently large State Police Force, that I am afraid I cannot do justice to the subject.

So that you may understand the manner in which the Force is operated and for the benefit of some of those present who may not me familiar with the work of the Department of State Police, I want, first, to give you a brief outline of the organization and the work of the Force, and then I will explain some of the benefits the rural districts derive from its services at the present time.

This Department, and the State Police Force, were created by an act of the Legislature in the Spring of 1905. One of the shortest bills I am told that has ever been passed by the Legislature. As far as the organization of the Force went, the act simply provided that the Superintendent should be appointed by the Governor, designated the number of men and fixed their salaries; the details of organization, selection and examination of applicants, equipments, arms, uniforms, duties, location of the men and rules and regulations governing the Force were all left to the Superintendent. The act then said the members of the Force "were empowered to act as forest, fire, game and fish warden" and "wherever possible to co-operate with the local authorities in detecting crime, apprehending criminals, and preserving law and order throughout the State."

The force, consisting of 8 officers and 220 men, was organized, equipped, mounted and ready for duty January 1, 1906. These 228 men were selected from over 1,000 applicants, after a careful mental and physical examination, and a thorough investigation of their characters, morals and past records. Only men who were qualified physically, mentally and morally were selected. And I may add that since the Force was first organized, the same care has been exercised in the selection of the men, and only those qualified in every way have been accepted. New men are enlisted as privates only, as all promotions are made from our own ranks, for merit, after a strict competitive examination. As soon as enlisted, all recruits are sent to the training school at the Pottsville Barracks for four months' schooling before being allowed to go on patrol duty. During this time the recruits daily attend a school, conducted by the commanding officer, where they are instructed in the duties of a State policeman, the criminal laws, the game, fish and forestry laws, and the care of horses, equipment, etc. They are also drilled daily, both mounted and dismounted, and are given constant target practice. If at the end of the probationary period they have proved themselves efficient they are assigned to their permanent stations, and during the balance of their term of service they must attend the Troop Weekly Schools, conducted by the Troop Commander, where they continue to receive instructions in the laws of the Commonwealth, detective and general police work. All punishments in the Force are made by fine or dismissal, after a fair and impartial trial by court martial. The charge, specification, evidence and sentence of the Court are submitted to me, as Superintendent, for approval or disapproval and this decision is final. If a man is once dismissed from the Force he is never allowed to re-enlist, and no influence can either get an undesirable man on the Force, keep a man on the force who has proven himself unfit, or have a man reinstated who has once been discharged. Politics or personal interest have never influenced a single appointment. If the applicant is qualified in every way, when a vacancy occurs, he is enlisted, if he is not qualified he can never be enlisted.

The barracks and stables and the four troops composing the Force are located in Pottsville, Wyoming, Butler and Greensburg respectively. By this distribution there are two troops in the eastern end of the State and two in the western end. Daily mounted patrols from each troop cover the roads within a radius of 25 or 30 miles of their home station and afford protection to the residents within that radius; but in order to afford all protection possible to communities more distant from the barracks, each year from 45 to 50 substations, consisting of three men each, are established throughout the different counties and are kept out so long as the appropriation available for this purpose lasts. Two men from each of these substations daily patrol the roads within a radius of about 25 miles, leaving the third man on duty at the station ready to ansewer any calls for assistance in the immediate neighborhood, and these patrols from the barracks and sub-stations combined cover hundreds of miles daily and afford protection to many localities that are practically without other protection. During these patrols the men maintain law and order in their districts, render assistance upon the request of any citizen, investigate and report on any crimes that have been committed, and enforce the game, fish and forestry laws, and act as wardens for these departments. They have assisted in extinguishing innumerable forest fires and have made many arrests for violations of the game laws, and have frequently assisted the Department of Health in maintaining quarantine during an epidemic of some cantagious disease. One quotation from the Game Commissioners' Report for 1908 will show the assistance they were to that Department:

"The greatest assistance I had in enforcing the law has come from the State Police. Every request from this office for help has been promptly honored. In my report of last year I cited the fact that during the year 1906 fourteen of our men were shot at, seven shot and four killed by foreigners, with not one of the perpetrators punished. At this time I do not know of the wounding of a single one of our men this year. This changed condition in my opinion is due to the creation of the State Police and to the unhesitating, determined and persistent pursuit of wrongdoers of all classes by the members of that Force."

In addition to the regular and special patrols, some men from each troop are constantly detailed for detached service for detective work, either in assisting Sheriffs, District Attorneys or Chiefs of Police in securing evidence, in locating and apprehending persons known to have committed some crime, or in ferreting out crimes and arresting the criminals.

You now have an idea of the method pursued in organizing the Force, the manner in which it is conducted and the general duties of the men. Unfortunately the number of men is so small, and the Legislative appropriation so limited that the usefulness of the Force is greatly handicapped, as, with the present force it is impossible to comply with one-third of the demands for assistance, or to afford protection to more than a small proportion of the rural communities that are constantly asking for details of our men.

To give you an idea of the demands made upon the Force, I may tell you that during the year 1912 we received 2,592 requests for assistance, nearly 8 a day for every day in the year. These requests came from Judges, Sheriffs, Mayors, Chiefs of Police and private citizens, all of small towns, hardly a request having come from the large cities or towns that had police protection of their own. Contrary to the opinion of a large number of residents of this Commonwealth who think the State Police are about the same as a fire company, sitting around the barracks or fire house, waiting for a riot or fire call before going out, the members of the Force are daily on duty patrolling the roads all over the State, as you can understand when you realize that 200 men travelled over 491,000 miles last year. In six years the Force has covered 2,642,000 miles and made 20,567 arrests, a record it would be impossible to achieve if the men were used for riot duty only.

And I should like to say just a few words here in reference to riot duty. As you know riots are usually the result of a large number of idle men, who have been thrown out of work by a strike of one sort or other, and who finally through anger, idleness and more or less alcohol, start a disturbance. At such times the local authorities cannot afford all the protection needed, in many cases they have really no police protection except the usually inefficient, lazy and sometimes criminal constable, with absolutely no experience in police work, and the old sheriff system of swearing in deputies to assist in enforcing the law having proved its utter in efficiency time and again, the State Police are called upon as a last resort. While I consider the greatest benefit derived from the State Police is the prevention and reduction of crime in the rural districts, unfortunately the most sensational service is in checking riots caused by strikes or other industrial disturbances, and as we consider the merits of a strike have nothing to do with the maintenance of law and order and do not give a mob the right to defy the law, destroy property or imperil the lives of innocent people, and as our men are efficient, fearless and absolutely unprejudiced in enforcing the law at all times, we incur the emnity and opposition of certain labor elements, although I am glad to say the more intelligent English speaking laboring man now realizes that the State Police is quite as much benefit to his family and himself as to his employer.

The labor agitators claim, that the members of the State Police are employees of corporations and are only used to intimidate the laboring classes, is disproved by our own records which show that during the year 1912, out of a total of 1,144 arrests for over 80 different crimes, only 10 were for rioting, while 17 arrests were for rape and 23 for murder. The Force made as many arrests for horse stealing as it did for rioting, and three times as many for trespassing and five times as many for burglary, and none of these crimes, except rioting, were committed in towns or cities, but in the rural districts.

There are thousands of acres of farming land in different counties of this State where a uniformed officer of the law has never been seen, miles and miles of good roads that are unpatrolled and large groups of settlements without police protection of any sort. These populous settlements have sprung up all through the State in the last ten or twelve years, and yet they have no more police protection today than they had before the towns were built, and while the inhabitants of these new towns, and the surrounding farms, have used their combined influence to secure all the modern conveniences for their localities such as the telephone, electric lights, water supplies, gas, etc., they have made no effort to obtain the one thing that is more important to their families and themselves than all these put together, and that is protection to their women, and to life and property in their neighborhood.

To my mind the most unpardonable crime in the whole category of crimes is that of RAPE or ATTEMPTED RAPE. According to law the most serious crime is MURDER, as that is the only one that is punishable by death, but the victim of a criminal assault, unlike the murder victim, lives for years, frequently a mental and physical wreck, and while it should be a matter of mortification to every law-abiding citizen of this Commonwealth that this particular crime occurs so frequently in the State, yet we cannot close our eyes to the facts, and records of this Department show that we have made over 150 arrests for Rape or Attempted Rape since the force was organized, and God knows how many times this crime has been committed without being reported to this Department. And all of these crimes were committed and arrests made in the rural districts. Not having a sufficient number of men to properly patrol more than one quarter of the State, our men are apt to be many miles distant from the scene of the crime and usually several days elapse before they are even notified that the crime has been committed, and under the circumstances I consider it remarkable that we have been able to make so many arrests and secure so many convictions.

Apart from security to life itself that the proper police patrols would assure the residents of the rural districts, they would also afford protection to the hundreds of thousand of dollars' worth of personal property and livestock owned by the farmers and at present without the slightest protection. In these days of automobiles and hundreds of miles of good roads the unprotected property in the rural districts is almost at the mercy of the professional burglar, and although the few men we have by their knowledge of country life and its conditions and the intelligent detective work resulting therefrom have been able to control the criminal instincts of the lower classes to a certain extent, and to quickly and correctly ferret out many of the country crimes, to successfully protect the lives and property in the rural districts, we must have more men and more money. Many more men and sufficient money to maintain them. With a sufficiently large Police Force there should not be a distant or sequestered farming community in the State where life and property would not be as safe as it would be in any large city. It is impossible for 220 men to properly patrol 45,000 square miles of territory, and while they do cover as much ground as possible, as our records of about 500,000 miles a year will show, our men cannot be in more than one place at a time nor can I make one man do the work of six.

I consider the failure of the last Legislature to increase the Force and provide sufficient funds for its support in the rural districts, a direct invitation to criminals and disorderly characters and I hope our appeal to the next Legislature for more men will have the support of every farmer in the State, for farmers really derive more benefit from the State Police Force than any other class of citizens in the State, as it means to them protection to their homes and families in localities where there is no adequate police force and are too far removed from large centers to obtain quick aid in case of necessity; assistance in case of fire, flood or other trouble and knowledge of protection within easy call; aid in the preservation of the game and fisheries by the detection of the violators of law through constant patrol in unfrequented and isolated sections; the enforcement of the liquor laws and the suppression of illegal resorts in isolated places, and the better and more intelligent protection of all Rural Districts, than is now afforded by local constables, by an efficient police force, always on duty, trained to the service and flexible to its movements.

The CHAIRMAN: Next on the program is the report of the Meteorologist, Mr. E. R. Demain, of Harrisburg.

SECRETARY CRITCHFIELD: I don't think Mr. Demain is present.

The CHAIRMAN: Next is the report of the Mineralogist, Dr. Isaac A. Harvey, of Lock Haven, Pa.

SECRETARY CRITCHFIELD: Mr. Harvey will not be here and has not yet sent in his paper. I would be very glad if the Chair would entertain a motion that if Mr. Harvey's paper is sent in, it be printed with the proceedings of the meeting.

A motion to the above effect was then adopted.

(Subsequently the report was sent to the Secretary, and is as follows):

## REPORT OF MINERALOGIST

By DR. ISAAC A. HARVEY

In a former report, I referred briefly to the gas and oil aspects of our State, and suggested the probability of new discoveries of these important factors of domestic use, commerce and manufacture; so that any verification of my forecasts in this direction would be of some interest to you and indicate the still wider possibilities that invite investigation and effort with reasonable prospects of success.

A noteworthy instance in this connection is as follows: Last summer I was employed to examine a gas well, drilled in 1902 in a northern township of Lycoming county, and while this well never produced a strong current of gas or of sufficient volume to be of any immediate commercial importance, yet there constantly issued therefrom a certain limited flow of the fluid which is even now coming forth and which betokens that in that locality there is a good prospect of finding a paying well, if the necessary drilling be done. At a depth of 1,686 feet the well gave a moderate flow, that, being lighted, rose to the height of 8 or 10 ft., but as the well was never "shot," as the saying goes, with glycerine or dynamite, the actual force and volume of the gas beneath was never ascertained or even approximately conjectured; and I was informed that the driller, having penetrated to the proper depth, that is, through the Catskill Red Sand Stone, No. 9, of our State termiology, into the Cheming Rocks No. 8, insisted that a greater volume and a true normal current or reservoir of the gas would be found at a greater depth, and that the weak current that was issuing from the hole would very shortly cease and its source soon be exhausted. Therefore, being opposed to the shooting of the well (which, in reality, had reached the proper horizon of the gas) he continued boring until the well reached a depth of 2,400 or 2,600 feet beyond the depth and into rocks wherein a good flow of gas could in no sense be reasonably expected. The well was "bridged," as they called it, by plunging therein a bunch of brush and thus partly closing it; but the gas has continued to issue in a greater or less degree during the entire eleven years since it was put down; and recently, as one interested in the prospect, I was notified by letters that more gas is now coming from the hole than it showed when I was there in the summer.

Now the one very evident mistake was the omission, the oversight in not putting a shot into the well with nitro-glycerine at 1,686 feet whence the gas was struck and arose; so that, if there was any considerable body of gas of economic value within a short distance of the bore hole, the effect of the explosion of nitro-glycerine, at the proper depth, would have been to increase the flow of gas by shattering the surrounding rocks and enlarging the fissures or crevaces through which the limited amount of gas had come to the surface and leading to the original body of gas, which, if present in considerable volume, might have afforded a flow of commercial importance and value. In short, the drill may have penetrated within a few feet or yards of the original body of gas and, in that event, a shot would probably have opened an outlet for the same into the bore hole and thence to the surface.

The driller was mistaken in the first instance, in not recognizing that he had reached the rational horizon of the gas at the depth of 1,686 feet and in the Chemung formation whence most of our gas in this State is derived; but the most important fact connected with the experiment is that the gas was found not west of or beyond the Allegheny Mountain, as in every instance where it has been proved efficient and of economic value, but the location is 2 or 3 miles east or southeast of the Allegheny Mountain, thus demonstrating the actual presence of gas near or along the eastern slope of the mountain, not as yet, however, ascertained to be of extensive importance or value, but proved that there has issued from rocks east of the mountain a permanent though moderate flow of gas that justifies a further and conclusive investigation. The course of the Allegheny Mountain, as it enters this State from Maryland and along the Somerset county line, is almost due north and south; that is, from north 5 degrees to 10 degrees east, and thence as we follow it through the State its course is deflected eastward so that through Centre county its trend is almost due northeast and through Lycoming a portion of its distance and near the location of this gas well is about north 65 to 70 degrees east. Thence into Sullivan county its course is nearly due east and west. Therefore, when we speak of a locality or section west of the Allegheny Mountain we refer to the course of the mountain through Centre and along Cambria and Somerset counties, and when we speak of this mountain in reference to Clinton or Lycoming county, as to the location of the oil and gas fields, we should say northwest of the mountain; while, indeed it would be more proper to say, north of the mountain, when speaking of its trend through Lycoming county. But the rocks that form the mountain are the same continuously from the Maryland line to its entrance into Sullivan county where it almost loses its well defined crest and seems finally lost as we approach the Anthracite coal fields; and even there, the traces of the old Allegheny can yet be discerned. Hence the conclusion is logical that flowing wells of gas are possible of location and commercially important before we reach the eastern escarpment of the southeastern escarpment, as the case may be, or even the foothills of the Allegheny Mountain; and the effort will be made to substantiate this prognostic or theory under the direction of your humble servant in the region of the gas well described, and means are being secured for that purpose.

Again, the gas wells in the northwest counties are becoming weaker and evidently are slowly but certainly exhausting themselves, and in the Bradford region, McKean county, as elsewhere, some wells are being put down to a very much greater depth than the usual gas and oil horizons, and into and through the formations beneath the Chemung and Catskill rocks wherein, heretofore, these deposits have been fund. In fact it has been stated to me that the Bradford people will venture to reach even the Oneida sandstone, if they shall not encounter a flow of gas prior to reaching that depth; in hopes, also, that some unknown, unsuspected or unspeakable lead of gas may respond to their efforts and allay the misgivings and apprehensions that now beset them by reason of the impending exhaustion of gas from the wells that have long supplied the demands but are now threatening to cease altogether. One hole has recently been put down more than 6,000 feet and far beneath the usual and well-known gas horizons, but has failed to respond favorably to the drill. Apart from the foregoing intimation of gas in or near the Chemung formations and close to the eastern or southern base of the Allegheny according to location, what might occur if we were to drill, not 6,000 or 7,000 feet, as is being done in McKean county, but if we begin, geologically, say 10,000 or even 15,000 feet lower than the McKean field and penetrate the limestones of our No. 2, or lower Silurian formations, which in Ohio and Indiana afforded for some years as astounding flow of the fluid which is now so needful for present and future use. No one can forecast what may be learned or acquired in this direction by judicious investigation, inasmuch as so many formations have furnished immense flows of gas in the various states of our Nation and in the several nations of the earth, and no human foresight can predict what measure of success may respond to the efforts that may be made by testing or drilling those formations that only present to our vision or surface inspection, a quiet and immobile repose of rocks, strata and structure, seemingly undisturbed even in their remotest depths, by the presence, pressure or agitation within them of the gaseous fluids that, when released, will manifest their power and vigor and potency and effective energies for the application of man to his own ends and varied accomplishment in a commercial way.

But the ways of Providence, for Providence it is, are inscrutable and past finding out and the thoughts of men are widened with the process of the sun. The wastefulness manifested in so many departments of our national life and in our appropriation of the gifts of nature and nature's God, must "give us pause" when we view the menace that is implied in the exhaustion of timber and of gas and oil and the most serious and impressive lessons of National, State and individual economy are yet to be learned by severe experience and privation.

## SOME FIGURES ON CLAY PRODUCTS

I have noticed in the recent reports of the U. S. Geological Survey, that the total clay products in the U. S. diminished from a value of $170,115,974 in 1910 to $162,236,181, in 1911, a decrease of $1,879,793, and the report for 1912 does not show any improvement. This may be due to the advance in the efficiency of cement which has very largely invaded the domain of structural work of all kinds, and possibly in a minor sense, may be ascribed to some fluctuations in general business matters and a decrease in the average building and structural enterprise and development. From 1910 to 1911, Ohio increased over a million dollars in her clay products, while, unfortunately, Pennsylvania decreased nearly two million dollars; the same condition seems to be prevalent yet, unless the report for 1913, when it is issued, shows improvement for our State, which, from vague intimations at hand, seems probable.

An interesting variance is noted in the increase of the common brick product in the U. S. from eight and a half billions in 1902 to more than ten billions in 1906, and thence back to eight and a half billions in 1911; and the same inflexible law, seemingly begotten by the cement industry which more than holds its own, and, indeed, is crowding the others, is destined to continue. Wherefore, lookout for cement in the future and study your limestone deposits as jutting forth on your farms and hillsides. Find out what they are. In other figures we note that vitrified paving brick are holding their own: in truth, are increasing in demand from 1902 to date and on the average will compare favorably with any other clay product in a progressive way. As applied to street purposes, cement impair or retard the advancement of vitrified brick. Last year, my report set forth the excess of Ohio's production of certain clay products and her apparent advantage over our State even in securing some of the eastern markets; and a case in point was presented to me last September, when I was employed by some New York gentlemen, associated with some Pennsylvania people, to make a report on a Red Shale deposit in the vicinity of New Hope, Bucks county, where some developments and tests had been made of the Red Shale, with very gratifying results. However, a certain Ohio geologist came to that section and, after a somewhat hurried examination, have given the property a doubtful character and aspect, and indicated for it a very limited promise of success. Upon my examination the deposit of some hundreds of acres of Red Shale, as controlled by the people that employed me, to be of excellent and exceptional quality for the manufacture of building and street paving brick; and in truth, the best deposit, in some respects, I had ever examined, not disparaging the many prosperous establishments elsewhere in the State where the raw material is first class and the products justly acceptable in market.

Upon some further tests, made after my visit, the value of the clay and shale was demonstrated beyond all peradventure or question by an Ohio Ceramic Engineer; and it seems to me that the purpose of the geologist from Ohio, in unison with the desire of those that sent him to New Hope, was to eliminate the Red Shale deposit thereabouts (of almost limitless quantity) from any possible interference or competition with the Ohio trade in the markets of Philadelphia, New York or other Eastern cities; for the product of this New York deposit can be delivered to said Eastern markets, with a good margin of profit for the cost of the Ohio brick without profit, the difference being in the freightage. There is a marked advantage in delivering brick 40 or 50 miles, over delivering them 400 to 600 miles; so that the Ohio brick makers were sensible of the very distinct advantage that a plant at New Hope would have over a plant somewhere in Ohio; at least, when it came to the competition for the trade of Philadelphia, New York, Boston, etc.

### GRAPHITE OR PLUMBAGO

An industry, formerly of minor importance and now emerging from obscurity, is the production and use of graphite, which, in portions of the State, at least, merits more attention than formerly. The increasing demand for various uses, which I cannot set forth in detail, indicate a promising future for this mineral. The State is publishing a series of reports under the direction of The Topographic and Geologic Commission, and, I believe, the volumes thus far issued may be obtained from Mr. Richard R. Hice, State Geologist, Beaver, Pa., the last volume, No. 6, describing the graphite deposits and production in this State. Samples have been sent to me, purporting to be graphite, but which were in reality only black slate, of which the analysis did not reveal any of the qualities of ingredients of graphite.

In this connection, it is wise to express an admonition with reference to promoters who invade all the towns and townships in this State with the motive of getting something for nothing, leasing mineral properties, making or having made on the same, false and fabulous reports, and then trying to dupe the moneyed men or capitalists in the cities by leading them into an investment in mineral values, so called, which have no actual existence but are merely the figments of falsehood and deception. There are some promoters that are sincere and seek to make a profit justly by handling minerals or other properties; but a great majority of men of this kind are not to be trusted, and it is well to give them a wide berth. As a rule, beware of promoters and let me say, from my own experience, that three out of four of them, as far as I have discovered, are not honorable or trustworthy.

There are many of our mineral deposits that deserve, from even the farmers, more than incidental study and attention, so that such values as may be on the farms may be readily discovered and understood and the farmer's intelligence in this direction will be of real worth to him in event of locating any mineral deposits, but a certain moral and mental interest also attaches to this knowledge, which affords diversion and pleasure, while he may be informed when the "false prophet or prospector or faker" happens around to rob him of his possible mineral values, as I have seen so often done, because the farmer and others don't know anything about the rocks and minerals.

The U. S. Government issues each year, 2 volumes of "Mineral Resources;" one descriptive of the metals, the other of the nonmetals, and an immense amount of data and information therein is of practical import to the farmer, as well as to others. These reports, as many more may be obtained from the Director of the Geological Survey, Washington, or perhaps, your Congressman will send you any volumes you may request, as the same are for the people and those that appreciate them. I suggest and urge the wisdom of your sending for these reports and reading them.

May I not, as incidentally heretofore, be indulged in a digression that has so often presented itself and demands more than hitherto, the consideration and study of all well thinking people? Many times it has been said to me, and perhaps by reason of some exceptional discoveries and wide experience along my line of work. "You ought to be wealthy; worth half a million," etc., and I have sometimes thought, that having enriched others by fortunate developments and uncovering unknown mineral values, I should have a competency by this time; but in a reflective sense and in retrospection, the possession of half a million, would enable me to buy in a group, a Webster, Clay, Lincoln, Garfield, Grant and McKinley and yet have remaining sufficient to live my years on "easy street"; but would such a reality of finance or property place me on a parity with any one of these noble Americans? Better, it seems to me, to have earned justly half a million and not possess or enjoy it, than not to have earned or made honorably half a million and yet possess and enjoy it; exacted, indeed, from honest toil and integrity that are struggling along; for it is true, as says Ruskin, that "much treasure is heavy with tears as an illstored harvest in an untimely rain, and much of our gold is brighter in the sunshine than in the substance"; and you readily see the figure and its application. But it is not figurative to say that the element of duplicity, a little lying, exerts more than an incidental influence on our national life and character and commerce than will insure general happiness, and it is an unsolved question, a problem, whether a half or more or less than half of our business is conducted honestly and whether more than a moiety of business men are moved by a spirit of honor and integrity. Facts and reflection indicate the trend of these things and it has been said that most of our wealth in the hands of those who have not earned or justly gained it, "is but the gilded index of a far reaching ruin."

Is it not an ominous fact that, as a nation, we occupy a conspicuous position in the eyes of civilization for having made more of a crime of business than any other nation in ancient, medieval or modern history; due to our exceptional intelligence and monetary skill and sagacity. And have we not perfected in a way the exact science of stealing and graft? Do you say this talk is pessimism? Nay, it is Jeffersonism; it is Lincolnism; it is Americanism. Jefferson, viewing the perfidy of the nation and its presumption and corruption, even in his time, exclaimed—"I tremble for my country when I remember that God is just and that justice will not always sleep;" and Lincoln echoed the same thought in his life; made it manifest as a living principle in his character, spirit and deliverances; namely, that we may not always refuse to bow to the will of God in our policies. Jefferson was logically the political progenitor of Lincoln, and Lincoln the political legatee or descendant of Jefferson, and if you question this assertion, study the analogy of the two lives and learn the harmony of sentiment that existed in their records, even though half a century part.

Gladstone has said, and with the most pertinent truth, that the only solution of great national questions is by the spirit and principle and doctrine of Christianity; and, in view of these things, gentlemen farmers, among whom no infidelity can have a resting place, the thought must come with most material relevance and force, that unless we, as a nation, exist in the providences, purposes, and promises of the Almighty, which, to my mind, are all yea and amen in the Master and his Gospel, then we have no right, as a nation, to exist at all; and the world of mankind has a right to expect, nay demand of us a more upright and honorable national life, in respect at least to our business, politics and civic affairs. The influence that will amend and rectify these evils abides in the farmer homes of the nation; and whilst you have no disposition to vie with "frenzied finance" or enter the lists in rivalry with frantic business, nevertheless you are as much as any others, the victims of deception, and the objects more than others of envy. Albeit, you may rest in repose and contentment upon the sure basis of an honest calling and untrammelled probity and patriotism and give to all objurgation and detraction the benediction of a clear conscience, the blessing of an honest, earnest life and calling and purpose. For,

"Envy will merit as its shade pursue;
But as the shadow proves its substance true,
Envied worth, like the sun eclipsed, makes known,
The opposing objects grossness, not its own;
For when that sun too powerful beams displays,
He draws up vapors that obscure his rays;
But e'en at last those clouds adorn his way
Reflect new glories and augment the day."

The CHAIRMAN: Next is the report of the Apiarist. Mr. Klinger made his report as follows:

## REPORT OF APIARIST

By MR. H. C. KLINGER, *Liverpool, Pa.*

Mr. Chairman, Ladies and Gentlemen: If it were possible for me to take you into one of our up-to-date apiaries in the State, I could make my report a great deal more interesting; so, in accordance with the instructions given on the program, my report must necessarily be short, and this statement may relieve you of the fear that you might get stung.

Looking back over the year just passed a few things that are worthy of notice have taken place in the apicultural world. The year 1913 will be recorded in bee-history as having produced the largest crop of clover honey known for many decades. This is, however, true more of the whole country than it is of our own State. White clover was more abundant in this State than it had been for many years, but on account of some adverse atmospheric conditions during the early part of its growth, it failed to secrete much nectar; and later on the flow was cut short by the severe drought. It has been noticed that blossoms will secrete nectar only under certain conditions of the atmosphere. Frequently there is a profusion of flowers and bees seem to be entirely indifferent to them.

Two conditions necessary are a certain temperature and a certain amount of water in suspension. A day that is considered disagreeably warm and "stuffy" is always welcomed during blossom time because on such days bees will literally roll in the honey. These conditions vary so much, that while parts of the State report large flows of honey, others not far distant, report almost entirely failures even with an equally abundance of honey-bearing flowers. One of the remarkable records of the year is that of Dr. C. C. Miller, of Marengo, Illinois. He is a man 82 years of age, who has been in the apiary work over 50 years, and who appears to cap the climax of a useful career by securing a record breaker of a crop. His apiary contains 73 colonies from which he took nearly 20,000 pound sections of honey, or an average of 266 pounds per colony. His best colony stored 402 sections. This is not only remarkable in the production of honey, but in the fact that here is a man, at an age when most men have retired from work and usefulness, who still finds pleasure in his vocation and is active besides in contributing articles regularly to the bee-journals. The year 1913 has brought about no particularly important inventions, although many improvements have been made in the different machines and devices used.

Among the methods that are new is the unique way of introducing queens directly by the use of smoke, thus doing away with the loss of so much time and the danger of carrying infection of diseases through the shipping cage. Late in the season has come to notice a method of re-queening without de-queening. This has been practiced by several of our specialists with remarkable success. If this will work as well for the average bee-keeper as it has done in the hands of these men, it will simplify one of the greatest problems.

By way of explanation, I might say that the greatest trouble that we have in re-queening a colony is usually to de-queen it first and find the old queen. Our old system makes it necessary to de-queen a colony at least 24 hours before we introduce a new queen. The new system which these specialists have been trying is simply to take a new queen, raise the old colony and put about 3 puffs of smoke, strong smoke, into the colony so as to demoralize the bees, and in about ten minutes release the new queen at the entrance of the hive and follow her with another heavy puff of smoke, and that is all that is necessary. While it does not produce 100 per cent. of success, that method has been found, in the hands of these men, to be as successful as taking out the old queen first and then afterwards introducing the new queen by the shipping cage. It is a very simple process. It is now generally conceded that the Italian bee is the best all-around bee. It is the best worker, one of the gentlest to handle, and most immune to foul brood diseases. Cases are mentioned where the introduction of an Italian queen into a colony of diseased black bees has served to cure the colony of the disease. But with the different kinds of hives most commonly in use, it is impossible to re-queen from the fact that it is a difficult task to open a hive to find an old queen. If the new method works out any one will be able to change his stock to the kind desired without opening a hive.

As this is an intense age, an age of specialists, there has recently developed a tendency to specialize on bee-keeping, in queen rearing and in the production of honey. While it is being carried along with some other business as a side line, affording a means of pleasure or diversity, it has been proven that it can be made a profitable business. Several unsuccessful winterings and the spread of foul brood diseases have eliminated quite a number of beekeepers and has left the field more to the specialist, who is wide-awake, a student and who reads the bee-papers.

The most important feature of the year and that of most importance to Pennsylvania bee-men is the work of inspection of foul brood diseases. In 1911 a law was passed by the Legislature, but it failed to make any appropriation to carry it into effect. A number of willing men volunteered as inspectors and gave much of their time and means to combat the disease. The last session of the Legislature made a small appropriation. Two men were appointed and qualified as State Inspectors. The money not being available until late in the season, cold weather prevented much work being done this year. In all about 250 apiaries were visited by the Inspectors, mostly in the central and southeastern part of the State. The yards visited are scattered through 24 counties. With few exceptions no entire county was covered. The Inspectors worked where it was thought most necessary. The total number of colonies inspected was 6,797, and of these 774 were found to be diseased either with European or American foul brood; about three times as many cases of American as of European. The work of inspection is found to be a greater task than it was supposed to be; and the spread of the disease more alarming than it was at first feared. The work of the men is meeting with approval everywhere. In the majority of instances where colonies are infected with disease, their owners are entirely ignorant of it. On being shown the nature of the disease and how to cure it, they become at once interested and willing to fight it. The trials of inspectors perhaps are not to be counted. They meet with all classes and conditions of people in their work. The greatest hindrance, possibly, and also the greatest nuisance in beedom is the old kind of hive. It may be an old "bee gum" or box hive, a nail keg, a soap box or even an old log. It may be worse; an attempt at modern beekeeping, a home-made frame hive with frames out of all proportion to manner of comb building and combs running diagonally across the hive, all of which prevent any possibility of opening the hive without a cold chisel or crowbar.

The work of inspection will bring new life to agriculture. It will eliminate the old system of keeping bees whose success was marked only by the number of swarms. It will be the means of educating that class of persons who read no papers and who never come in touch with others that are alive and awake to the best. It will mean the use of better appliances and consequently the greater production of honey. There is a hopeful outlook for Pennsylvania bee-culture. The motto of one of our great beekeepers was "Keep more bees." The slogan of Pennsylvania bee-men should be "Keep bees better" and "Keep better bees" after which we may well adopt the motto of our lamented brother.

I might state here that we have an organization in Pennsylvania called The Pennsylvania State Beekeepers' Association, which I suppose consists of the most alive men in the State of Pennsylvania, in the line of beekeeping. There are a number of associations throughout the United States, nearly every State having its own association. Pennsylvania, in numbers, is second and is rapidly increasing. Our meeting will be held in this building on February 20th and 21st, and we invite the co-operation of this Board and of all beekeepers and men in the State interested in bee-keeping and invite you to our convention.

The CHAIRMAN: The paper will be received and published. Next is an address on "Fish Culture as a Source of Profit to the Farmer," by Hon. N. R. Buller.

Mr. Buller then delivered the following address:

## FISH CULTURE AS A SOURCE OF PROFIT TO THE FARMER

By HON. N. R. BULLER, *Commissioner of Fisheries*

Mr. President and Members of the State Board of Agriculture: It was with the greatest of pleasure that I accepted the invitation to be present at this meeting and meet face to face the men who stand for development of the farming industries of this Commonwealth, and whose highest aim is to make two blades of grass grow where one grew before. Born on a farm and growing up on the same until the time I went to work at the first State Fish Hatchery in Pennsylvania, I feel that I have a right to be counted as a farmer, for experience has shown me that the raising of fish by the farmer is as much a part of his work in providing food for the world, as any other so-called agricultural work. There are very few people, unless they have made a study of the subject, who appreciate what can be raised from an acre of water in the way of food with much less labor and trouble than any other livestock is raised upon the farm. I have, therefore, taken as my theme today the capabilities of an acre of water.

### WHAT AN ACRE OF WATER WILL DO

The possibilities of small areas of water for creating a food supply are little appreciated by the average farmer. There are few farms in the Commonwealth which have not a waste spot on them that, with little expense, could be converted into a pond which would serve as a breeding place for enough fish to furnish the family with a very considerable food supply and have some to sell. Of, several farmers might join together and build a larger pond which would serve to furnish them all with fish. The only requisite would be a supply of water sufficiently strong to prevent the pond from stagnating, and this supply need not necessarily be very large. When the pond is established it could be stocked with fish, preferably bluegills and catfish, both fish of the greatest fecundity and fine table fish. The bluegill has a gameness that makes his taking sport, even for the mast expert angler. With these fish should be placed in the pond a number of minnows and then the question of food supply for the fish is settled. Here, then, is a waste spot turned into a productive one and the feeding of the product requires no further outlay than the original investment.

The question of food supply is one that is attracting more attention than any other, and experts and theorists are devoting columns of language to explain how the problem can be solved so that food will be cheaper to the man of small means. It is an aid to this solution that the Department of Fisheries of Pennsylvania calls the attention of the farmers to the possibilities of the fish pond. Very few persons realize how much can be done with an acre of water in the way of producing fish, but the reason for this is that they do not know the productiveness of the two fish mentioned—bluegills and catfish. The small or no cost for their maintenance and how taking a supply of fish for a meal may be reduced to a sport seductive to the small boy of the family who hates to chop wood and really a delight to the mother and daughters of the household. The pond need not be much deeper than to hold sufficient water that will not freeze to the bottom in winter time, but of course, a depth of from five to eight feet would be an advantage. There is nothing adds more to the charm of a landscape than a glimpse of water, and the fish pond may thus become an attractive spot to the farm as well as a utilitarian measure.

When Bayard Taylor erected his home at Cedarcroft, near Kennett Square, Chester county, his artistic soul missed the absence of water; that section of the country being rather high and dry and devoid of considerable water courses. At some distance from the house, the poet dug a small pond which fed from a spring and then cut a vista through the woods which gave the sitter on the porch of the house a glimpse of the water, and it was wonderful what a touch of beauty that waterscape gave. It is not often in this work-a-day world that the beautiful and the utilitarian are united, but here the farmers have a chance to unite them.

The pond should be planted with an aquatic plant that will make it a thing of beauty and at the same time furnish food for the finny dwellers in the water, because it is the aquatic life that grows upon plants that furnish the nourishment for the small fish, and experience has shown that the number of fish that will thrive in a body of water is exactly proportionate to the amount of food that is there for the support of the little ones. Around the pond should be planted shrubbery which will also add to the food producing species for the fish, because insects will harbor on the bushes and their larvae and even eggs and themselves drop into the water. The excavation of a pond need not be an expensive thing and once constructed, the cost of maintenance is really nothing, while, as remarked above, the food supply will take care of itself. The best fish for such ponds are the bluegill and the catfish. The best variety of catfish is the common bullhead indigenous to the waters of Pennsylvania. It grows in length a foot to 18 inches, and weighs from one to two pounds, though sometimes running up to five and six pounds. "The horn pout or common bullhead," says Thoreau, the naturalist, "are dull and blundering fellows, fond of the mud and growing best in weeding ponds and rivers without current. They stay near the bottom moving slowly about with their barrels widely spread watching for anything edible. They will take any kind of bait, from an angle worm to a piece of tomato can, without hesitation or coquetry, and they seldom fail to swallow the hook. They are very tenacious of life, opening and shutting their mouths for half an hour after their heads have been taken off. They spawn in the spring and the old fishes lead the young in great schools near the shore, caring for them as a hen cares for her chickens, a blood thirsty and bullying set of rangers, with ever a lance at rest, and ready to do battle with their nearest neighbor."

As an edible fish, the catfish takes front rank in the minds of many people. A number of years ago there was a famous resort near Philadelphia, on the Wissahickon, where a visitor was escorted by the native that he might enjoy the pleasures of catfish and waffles whose praises were sung as being rivals to the ambrosia and nectar of gods on Olympus. One of the most enthusiastic trout fisherman in Pennsylvania once remarked: "Did you ever eat a catfish from a trout stream? I have, and I want to say that when I catch a catfish when fishing for trout, that fish goes into the creel to be kept for my personal breakfast. There is simply no fish his equal." There are few people who do not know the edible qualities of the catfish, but their tastes have been somewhat spoiled from the fact that so many catfish on the market come from undesirable waters, and are, therefore, not the best specimens on which to gauge a taste. The catfish from the ponds of the farmer would be a fair rival to the famed fish on the Wissahickon or the catfish from the trout stream.

In addition to furnishing food and sport, the fish pond would give the children of the farmer an opportunity to study fish lore, and given an opportunity, there is no doubt the children would take it, as the study is a fascinating one. The catfish herds its young in a round ball and moves them much as the herders in the West move the herds of cattle by the process of rounding them up. The bluegill is thus described by Jordan and Evermann in *American Food and Game Fisher:*

"The bluegill is perhaps the best known and certainly the most important of all our true sunfishes. It is found throughout the Great Lakes and in the Mississippi Valley, from western New York and Pennsylvania to Iowa and Missouri, and from Minnesota to Florida and the Rio Grande. It is one of our most valuable and widely distributed species, and is found in all lakes, ponds and quiet streams throughout its range. Though found in quiet streams, it is above all the sunfish of the lakes, and whether large or small is decidedly more abundant in the smaller ones. The bluegill is the largest of the sunfish. It reaches a length of 12 to 14 inches and a weight of nearly a pound, with a maximum weight of about a pound and a half. As a food fish, the bluegill is of much importance, and of all the species, it is one most often sent to market where it always brings a good price. As a pan fish, it is excelled among fresh water fishes only by the yellow perch. Its flesh is firm and flaky and possesses a delicious flavor, and among all the sunfishes, it holds the highest rank as a game fish. It can be taken at any time in the year, even through the ice in winter. It bites well during the Spring and early Summer, while very early in July until September, it is particularly voracious and fine catches can be made. It will take any sort of bait and it can be taken with any sort of tackle. Angle worms are probably the best bait, either in still fishing or trolling, but grasshoppers are also excellent, while grubs, small minnows, small pieces of fish or mussel are good, and they can be taken on the artificial fly or small trolling spoon. The bluegills usually keep in more or less definite schools and the patient angler can usually land them all. They do not seize the hook with a rush as does the rock bass, but quietly sink it in and the fight does not begin until the fish finds that it is hooked, but from then on the fight is of the most vigorous kind and is kept up to the end with a persistence and viciousness that makes the bluegill 'the gamest of all fishes for its size.'"

While, as said above, the fish pond can be made a source of profit and pleasure at no expense, or very little for maintenance, yet growing the fish is like growing everything else on the farm, there must be constant vigilance. Weeds grow in the corn field with a luxuriance almost equal to that of the fable, "Jack's Bean Stalk," and they must be cultivated out or there will be no corn. The potato bug will quickly destroy a patch of potatoes, if they are not taken in time, and yet every one knows that the potato bug is not an unmixed evil, for prior to his arrival, potatoes were planted and left to take care of themselves, the result being that the crop was from 25 to 50 bushels an acre. When the potato bug made its appearance he forced the farmer to take better care of his potatoes and the result has been that where 50 bushels were fathered before, from 100 to 400 bushels an acre are gathered now. Fruit trees must be sprayed to prevent their destruction by scale and other insect enemies, while even the housewife finds her little astors cut off by a bug as they appear above the ground, and worms and other insects render her rose bushes unsightly instead of pyramids of bloom, unless she exercises the utmost vigilance. Water snakes will appear in a pound with an appetite that is startling. Algae will grow in the water and must occasionally be removed when it grows too thick. Kingfishers will appear to collect from everywhere, each armed with an appetite for fish, but two or three poles set around the pond on the top of which are placed traps will reduce the number of kingfishers to the minimum, and the minimum can be still further reduced by the careful use of a shotgun, and the shotgun for the kingfishers will train the boy up to be the handler of a weapon, a desirable thing, where the army is composed, in case of war, almost entirely of volunteers who will be practically valueless unless they can shoot.

Herons will also be attracted to the ponds and they have a voracity which is appalling. The blue heron, after gorging himself, will take an additional number of fish and place them in rows on the bank covering them with some material. These fish disappear in time, but whether taken by the heron or something else, there is not sufficient testimony to tell. The herons are mostly night birds, and therefore not so easily seen as the kingfishers. Muskrats will come and dig holes in the bank, which, if not watched, will result in a crevasse which will allow the water to run unexpectedly away and leave the pond a dry waste with the fish dead upon the bottom. A steel trap or two will place the muskrats in the situation of a good muskrat, in, that his flesh is edible and his pelt is worth now from 75 cents to a dollar each. There is a prejudice against eating muskrats, which is due largely to its name, the muskrats being really beavers and beaver's flesh is considered a delicacy. The muskrat is sold in the restaurants at Baltimore and is rated a dainty as the muskrat feeds exclusively on vegetables and carefully washes his food before he eats it. While as an enemy he is a source of trouble, he can be converted into a pleasant edible and his hide into a merchantable article.

It might be said here that if some tadpoles were introduced into the pond the result would be frogs, and the fish diet may be supplemented occasionally with that of frogs, though the frogs will not thrive in very large numbers in so small a pond. Certainly it is a very tempting picture to a man who appreciates good living and enjoys fun in getting it rather than hard work. Here is a fish that is described as next to the daintiest of fresh water fishes as food, and the gamiest of all fishes of its size. How much more delightful on a hot day would it be to go down to the fish pond and inveigle out a mess of bluegills for supper than to chase around in the hot sun a light footed rooster which objected to having his head cut off.

The Department of Fisheries has grown up from small beginnings when it was first found that artificial propagation was the way to keep up the supply of fish. The waste ordinarily from propagation naturally is very large on account of the numerous enemies that have to be considered, but many of these enemies are eliminated in the pond so that the natural processes ought to keep the ponds stocked. This can be supplemented, annually, by new blood obtained through the Department of Fisheries.

While probably the most talked of work of the Department of Fisheries is the propagation of the game fishes, such as trout and bass, this is really but a small end of its work. Food fish are the most valuable kind, being propagated for Lake Erie by the hundred million annually, and the Department today is striving in every way to stock the streams with the food fishes indigenous to them, and is now striving to induce every farmer in the Commonwealth to add to his resources by building a fish pond and stocking it with the fish described in this paper. The Department stands ready to render every assistance to the pond builder in the way of advice and the procuring of stock fish, and the Department is satisfied that if one man in a neighborhood will take the matter up practically, that it will not be long until he will convince all his neighbors that a fish pond is not only a proper adjunct to the farm in the way of furnishing a food supply, but a source of continual amusement to the whole family, especially the women and children, in the way of alluring sport and an additional beautifier to the already wonderful landscape of Pennsylvania.

Some twenty or more years ago the United States Government authorities introduced into the United States the German carp, it being induced to do so by the fact of its enormous prolificness, and the fact that it is the main source of food supply in parts of Europe.

They did not reckon with the fact that the carp is an inferior fish to many species of the American finny tribe and that it introduced a fish to upset the balance which nature established. Fish are mostly cannibals and one species preys upon another, but under the laws of nature they balance and an equilibrium has been maintained. The carp brought in a vegetable feeder that preys upon the roots of plants and destroys therefore the vegetation which furnishes the breeding places for much of the food of the other species of fish, and at the same time is a spawn eater. Its introduction is a mistake, but it is here to stay. Captivated by the stories of its fecundity and the probable wealth to be acquired in growing them, numbers of fish pond were started and stocked with carp. The experiment proved a failure because in small ponds and warm water the carp proved a fish that few people wanted, its flesh being coarse and to a certain extent tasteless. Thus the carp raising proved a financial failure and there are few, if any, carp ponds now left in the State. The carp escaped to the rivers and lakes and have increased enormously, but in purer and colder water the flesh is better than that of the fish grown in the smaller ponds.

In the case of the American fish spoken of above, their flesh is not affected in the way that the carp was, and therefore the grower of them is always sure of dainty meal.

It is difficult to make an estimate as to the cost of a pond, but in most farms there is a low-lying spot with a tendency to swamp other land, which, if an embankment could be raised, would make the necessary pool. Both the bluegills and the catfish are warm water fishes and will thrive, no matter how warm the water gets in the summer time, and will even stand a certain amount of stagnation. They are thus eminently fitted to meet the requirements and really will thrive in the same water that the carp would, while at the same time they do not lose their flavor for the table. No boy needs to be told how to catch a catfish, and after one cast of the line any girl is a devoted angler for sunfish, and the command of the children to go and catch a mess of fish will be greeted with smiles, where sour looks would be returned on an order to do some other kind of farm work.

Fish diet is commended as one of the best, and many dietarians point to the hardy dwellers along the seashore as examples of a race that grow up on a fish diet.

When the Department has completed all its plants for perfecting its hatcheries, the limits of its capacity to furnish fish for restocking the waters of Pennsylvania will only be limited by the demand, and if all the waste spots on the various farms should be turned into fish ponds, there is no question that the problem of a cheap food supply will be very near to a solution. A pond of the size of an acre ought with attention produce from 5,000 to 6,000 pounds of fish a year, and this with no expenditure for food. If, however, artificial food should be used, of course, more fish can be taken out of the pond. Five thousand pounds of fish at ten cents a pound is $500.00, and there are not many acres in Pennsylvania which are returning that revenue to the farmer. Like every other procedure, it is under the primeval curse, and the man who has a fish pond must give it at least some time and attention. Muskrats come and attack the banks of the ponds and possibly allow all the water to run away at an unexpected time, meaning the loss of all or many of the fish. Cray fish will also attack the banks and do much damage, but all these drawbacks are small compared to the yield that the farmer will get. The best way to stock a pond is to procure about 200 adult fish and then the fish will proceed to increase and multiply in marvelous jumps, until the farmer is sure of his thousands of pounds of fish, which not only means a very desirable revenue, but at the same time the taking of fish affords sport, and the farmer's family has a pleasant change of diet in the fish. As remarked above, the farmer's children are apt to slide away from hard work, if it is possible, but it is doubtful whether there is a boy or girl who having once tasted the pleasures of fishing, would not want to spend as much time fishing as possibly could be allowed them.

The Department of Fisheries, as remarked above, stands ready to co-operate with the farmers in stocking the ponds, and will be glad at any time to furnish all the information it has upon the proper way to construct a pond. It will be seen that the business requires very little outlay of money and when it is in running order the yield of fish will be a surprise.

MR. STOUT: May I ask a question of the speaker?

MR. BULLER: Yes, sir.

MR. STOUT: I have a pond that covers probably an acre and a half, and occasionally, I have occasion to draw the water. A few years ago I had occasion to draw the water and was threatened with prosecution if I didn't catch the fish with a hook and line. So it is a question in my mind whether we have a right to our individual rights on private property, under those circumstances. If I should draw off that water and should catch those fish with my hand or with any other means than a hook and line, and sold some of them, wouldn't I be liable to prosecution under the law?

MR. BULLER: Under certain conditions you would; but the Department of Fisheries, as I stated, is anxious to assist the farmer and under certain circumstances we would issue a permit.

MR. STOUT: Well, if I want to get a permit, do I have to come to Harrisburg?

MR. BULLER: No, you can get it by writing. The object of a permit is to protect the fish that are not in private water. If the law was made so that everybody could fish in any manner they saw fit, it would be only a short time before there would be no fish left in the streams of the State at all, and for that reason the laws are made, but the law does not interfere with the man who makes a business of breeding fish in private ponds outside of a stream.

MR. STOUT: Must he get a permit?

MR. BULLER: **Yes, sir.**

The CHAIRMAN: We have a little time before adjourning, yet this is the last paper on the program. Is there any other discussion of any of the papers read this forenoon or any time?

**DR. CONARD:** I would like to ask at what age those catfish became large enough to use?

**MR. BULLER:** About three years.

**MR. STOUT:** I would like to ask Mr. Schultz why is it that the fertilizer bags have on, for instance, potash K2-o, actual potash K2-o, and then below they have on "equal to sulphate of potash," and to explain some of those useless phrases on those sacks. He is familiar with this business, and I would like to have it explained.

**MR. SCHULTZ:** In answer to the brother's question, the manufacturer is sometimes compelled to do things the same way as the other manufacturer does, if he don't, he will get into trouble. The question that the brother asked, I guess he can't find that on the Reading Bone Fertilizer bags and thinks he must ask somebody else to have that question answered, but there is another question in my mind while I am called upon, I think I must say a little on that subject. I was asked the other day why we put on the fertilizer bags a statement giving the phosphoric acid and right below that we said, "so much bone, phosphate of lime," and in answer to that question I want to say this, that a number of years ago, I came to a good farmer who was a fertilizer agent for another company; I wanted him to sell my goods, but the other man had printed on the bags "bone phosphate of lime," besides the phosphoric acid, which the company that I represent did not do at that time, and I told him that if he would take the phosphoric acid away, he wouldn't have the bone phosphate of lime left, or even if he'd take the bone phosphate away, the phosphoric acid would not be there, that it was one and the same thing in different terms. He always came back to me after I was done, and I thought I had him convinced that I was right. He said "Yes, but I still believe that if you had the bone phosphate in the bag, you would have it on the bag, too." The consequence was that I could not get his order and, therefore, I think that answers the brother's question here; if the fertilizer manufacturers, as a whole, observe certain conditions and have certain methods of printing the analysis on the bag, the man that does not do that, who drops one or the other form, why, the farmer is not posted well enough along those lines and if he does not find a great big string of analysis on that bag, he thinks the goods of that man are deficient, there's no question about that; the trouble is not with the manufacturer but the trouble is with the consumer. If you want to help the farmer, you must educate him. Even if that is printed on the bag, it is not a detriment to the farmer, but the farmer ought to know those things.

Then another question comes up; they say "You have no business to print those two columns on the fertilizer bag." The same question comes right in there; the majority of manufacturers are doing it; say, for instance, ammonia 2 to 3 and so on, and phosphoric acid the same way, and the man that don't print it, cannot find a market in a great many cases, simply because the farmer is not properly educated; the farmer don't know that it is only the firm column that is guaranteed and not the second.

MR. J. ALDUS HERR: In our county of Lancaster, we are growers of tobacco and have some difficulty, as it is well known that in effecting a good burn of tobacco, you should not use muriate of potash; sulphate of potash should be used to secure a better burn. Now, in all the analyses or nearly all of them, we find a certain percentage of muriate of potash equal to sulphate of potash, but that does not assure the purchaser that he is getting sulphate of potash and the packers of tobacco who buy our gods are forever casting it up to us that we are using muriate of potash. What assurance have I, when purchasing a good brand of fertilizer for tobacco, that I am getting sulphate of potash—what I pay for?

MR. SCHULTZ: The brother just admitted that it was not promised by the manufacturer that he was getting sulphate; he cannot blame the manufacturer. If he goes to that manufacturer and demands sulphate, he will certainly get it; if he does not, he ought to know the reason why. The trouble is not with the manufacturer, but the farmer don't want to pay the price of the sulphate; there is where the trouble is.

MR. J. ALDUS HERR: I beg your pardon, we will pay the price if we get what we are paying for; we don't get what we are paying for, that's the trouble.

MR. SCHULTZ: Do you mean to say that you bought fertilizer where sulphate was promised and yet didn't get it?

MR. J. ALDUS HERR: I do, yes. We have more than one instance of that kind, where it was promised by the agent; it didn't say sulphate of potash on the bag, but it says "equal to sulphate of potash"; and the agent would have you understand it is the same thing, when it is not. The one will not make a good burning tobacco and the other will. How are we assured that we will get it?

MR. SCHULTZ: Well, the manufacturer that promised that and didn't carry it out, I don't think I would patronize him any more, that's all.

SECRETARY CRITCHFIELD: My thought always has been that the statement "equal to sulphate of potash" means that the source of potash in that fertilizer was the sulphate, and where the statement is made "equal to muriate of potash," the indication was that the source of potash was the muriate.

A Member: Mr. Secretary, I am sorry to take issue with as big a man as you, but you are wrong; it means that it is equivalent to that certain amount in sulphate of potash.

SECRETARY CRITCHFIELD: Well, very much of the information I have gotten in my past life has come from my acknowledging that I didn't know; I am very glad to know this. It has always been my impression that where it said "potash K2-o equal to so much sulphate of potash," that the source of that was the sulphate; am I wrong about that?

MR. SCHULTZ: I would not say when it said "equal to sulphate," that the potash came from sulphate, but that it came from something just as valuable as so much sulphate.

**PROF. SURFACE:** I think the idea is that it contains the same amount of potash as that much sulphate would contain.

**MR. SCHULTZ:** Yes, yes.

**PROF. SURFACE:** But that does not indicate necessarily that the origin of that potash is the sulphate.

**MR. JOEL A. HERR:** I want to ask a question; I have sampled a good deal of fertilizer and know what is branded on the sacks; is it not a fact that, of later years, some of our leading fertilizer manufacturers don't put that on the sack at all, they simply say—give the minimum figures, don't put the two columns on the sack, but simply the one column, the minimum analysis of the brand used? And I think Baugh is one of them. If one man can do it, why can't the rest? It is evidently designed to deceive the farmer, that is the purpose of it, and there is no reason why it should be done. It need not deceive the intelligent farmer, but it is intended to play on the ignorant. Many a time I am asked what all that stuff on the sack is for and I don't want to discriminate against anybody's goods, but when a man asks me a plain question what that means, I am going to tell them if I know and put them right, and I will do it in very few figures. If one firm, Baugh, for instance, and there are some more that do that very thing, puts down the minimum analysis on the sack, I think the law ought to compel all of them to do it.

**MR. J. ALDUS HERR:** The muriate of potash contains muriate of chlorine, and chlorine is detrimental to the good burning of tobacco.

**MR. BRONG:** The reason I was not in this morning in time, Mr. Chairman, was that I was writing an article on the subject under discussion, and it will not take me more than five minutes to deliver it, while I am on the floor. The report of the Committee on Fertilizer read yesterday is an interesting one. I could not feel that I was doing my duty, either to this Board or the farmers of the State, if I did not add a few remarks on this subject. The report recommends the use of the highest priced fertilizers. The recommendation, when made to a specialist or to the more intelligent class of farmers, is a safe one, but where used logically to sell low grade mixtures or chemicals or high class chemical mixtures, it becomes the rock on which many a farmer's hope springs its leak. Phosphoric acid, the one element of plant food admitted by scientists, fertilizer manufacturers and farmers alike to be the most universal crop lifter, can generally be purchased most cheaply in the form of acid phosphate. Fourteen per cent. acid phosphate costs us $11.20 per ton, not reckoning a cash discount. Basic slag, which in our soil we consider even a better source of phosphoric acid, we purchase at the same price per plant food unit. The fertilizer manufacturer will take the ton of acid phosphate and divide it by two; that is, he will take out one-half of the phosphoric acid, he will then add to take the place of what he has taken out, one-half perhaps of one per cent. of ammonia or two per cent. of potash, and asks me $16.80 for the product. In other words, for a fertilizer containing nine and one-half units of plant food, the manufacturer asks $5.60 more than for the standard chemical on which it is based, and containing fourteen plant food units.

From this one little illustration it is very plain that the advise to buy higher priced fertilizers may be very misleading. So much for that. This report, my friends, contains another recommendation to which I would direct your attention for a moment, namely, the appointment of a fertilizer plant inspector by the State, the idea being conveyed, we take it, that if a State Inspector under the auspices of the Secretary of Agriculture, perhaps, would visit the fertilizer plants of the State and report on the kinds of materials found in and around such plants, it would tend to insure the use of high grade materials in the make-up of fertilizers.

The report has interesting statistical figures and the Chairman probably could extend those figures to show how much of the fertilizer purchased and used in the State is made within the Commonwealth and what per cent is manufactured outside. At a rough guess I should estimate that at least seventy-five per cent. of all the fertilizer and fertilizer materials sold and consumed in the Commonwealth, are manufactured outside the State. The means this Inspector would employ to inspect a fertilizer plant located at Baltimore, for instance, that did not wish to be inspected, your committee would have the legislative committee or the Legislature devise—not by any means an easy job.

Again, fertilizer manufacturers are, with a few minor exceptions, corporations and corporations have no conscience which would compel them to have all the materials, formulas, secrets, etc., of their business lying around for even a State Inspector to inspect; that, in the make-up of certain formulas of complete fertilizers there may be a large difference in the crop producing value, we are fully convinced; that the manufacturer who uses the high grade material should have proper credit for it, no man will gainsay; that the farmer who buys and pays for an article is fully entitled to know what that article contains is today admitted in practically all commercial transactions except in the matter of fertilizer.

After a discussion of a similar report, this body, two years ago, passed a resolution favoring the recommendation to the Legislative Committee of a law requiring all fertilizer manufacturers offering and selling fertilizers in the State to have printed on the bag or container the amount and source of each of the three plant elements, nitrogen, phosphoric acid and potash, generally contained therein. This will protect the farmer, encourage the manufacturer who uses good materials and wrong no man. Mr. Chairman, I offer the following resolution:

> "*RESOLVED:* That the Legislative Committee of the State Board of Agriculture frame or have framed an Act which shall require all fertilizer manufacturers or concerns selling fertilizers or offering same for sale in this State, shall be required to stamp on the bag or container of such fertilizers, in addition to the present requirements, the source or sources of either the nitrogen, the phosphoric acid, the potash, or any two or all three of these elements, as the case may be. The

> Act should provide for the chemical analysis of samples and provide that brands found not conforming to the printed statements on the bag or container should be refused license thereafter.
>
> "*RESOLVED FURTHER:* That the Committee make a firm and consistent effort to secure the passage of such Act.

MR. SCHULTZ: May I say a word in answer to that report?

The CHAIRMAN: Certainly.

SECRETARY CRITCHFIELD: Before the gentleman from Montgomery says his word, perhaps you had better dispose of that resolution. We have a Standing Committee on Resolutions and I think it would be well to refer that resolution to that committee; the Chairman can do that.

The CHAIRMAN: The resolution will be referred to the Resolutions Committee.

SECRETARY CRITCHFIELD: That Committee is not yet appointed but will be very soon.

MR. SCHULTZ: If I am not mistaken, we have a law on our statute books whereby the manufacturer is supposed to be compelled to print it on the bags, if he derives his ammonia from leather scraps. Leather scrap is the great sinner of this State, I can tell you that. On that product the farmers of Pennsylvania are throwing more money away that on any other particular thing, and that is the reason I rose, because I know what I am talking about. We have that law. We know that thousands of tons—it can be proved that thousands of tons of leather scraps are sold to the farmers of the State of Pennsylvania and manufactured in the State. We also know that nobody prints it on the bag. Why not? In the first place, if he did, he couldn't find a market for the—I almost said a strong word for it—he couldn't find a market.

Why don't the State compel him to state it on the bag? I think we had the answer two years ago from Dr. Frear. Is he in the audience? I wish he was here. Two years ago, after I made that report and presented that resolution to this body about having an Inspector appointed, he said it was a fact that it was almost impossible for the chemists to tell where the ammonia came from in the complete fertilizer and if it came from leather scrap it was practically useless as a crop producer. I had that same resolution brought before the Grange Convention at Reading, recommending a fertilizer Inspector to see the material before it goes in the goods. Those things are manufactured by a manufacturer that makes ten, fifteen or twenty thousand tons in a year. He cannot hide those things, you need not be afraid that you cannot find out what he is doing. A man would not have to be constantly at his factory; he does things in big quantities. I know a plant today that has a thousand tons of that leather scrap that is going to be sold to you farmers and you will pay for it the same price that you would if that ammonia came from animal tankage, blood or bone, and those things are not right; it is not justice to the manufacturer who is honest or to the farmer.

In what I recommended about low grade goods in my report, I was honest and can stand back of it. The man who wants to buy phosphoric acid and that only, wants to buy high grade phosphoric acid. If he wants phosphoric acid and potash, he should not buy a fertilizer containing only six and three; he should buy a fertilizer that contains all the plant food the manufacturer can get into that one bag, and save your freight, save the filler, but buy high grade goods, whether the raw material or the ready mixed fertilizer.

A Member: What is the highest grade of acid phosphate you can make?

MR. SCHULTZ: We get some material that runs 78 per cent. of bone phosphate; we can make 18 per cent., but I would not recommend the farmer to buy it, because if you send that out at 18 per cent. it is a question whether it is in good chemical condition, but we can send it out at 16 and sell a great deal at 14 and we sell the bulk at 12, but that is wrong; I am not talking now from a manufacturer's standpoint, but I know some things that have been hammered into me by hard experience.

A Member: How is ten and ten?

MR. SCHULTZ: That is a good fertilizer; wherever we sell a man 10-10, he comes back for more.

MR. STOUT: In collecting samples, I discovered one brand that was termed un-ammoniated phosphate, phosphate of lime. Can you explain the meaning of that? Those long words, I don't understand.

MR. SCHULTZ: I am not a chemist, I am a farmer the same as you are, but I know some things about fertilizers. I know what is practiced on the farm.

MR. STOUT: I understand that that means un-ammoniated;—not ammoniated, it would simply be South Carolina rock dissolved.

MR. SCHULTZ: That is what it is no doubt. The resolution I had, before it came out on the floor, there was enough influence back of that curtain that they tore it all to pieces and it came out meaning this, that the manufacturer would be compelled to print it on the bags if he derived his ammonia from leather scrap, but you cannot enforce that; the only way is to have the Inspector; make farming more successful, protect the farmer from throwing his money away; that will reduce the high cost of living too.

SECRETARY CRITCHFIELD: I want to say that the Department has been very careful in having those examinations made for the things that are forbidden to be sold without its being stated on the sacks. Wherever the information has come to the Department that things that are forbidden have been found and yet not named on the sacks, prosecutions have followed.

There's just one word more—this discussion is very interesting, I shall be sorry to stop it; but I want to say to the Board that, judging from the interest that was manifested in the discussion on roads yesterday, I thought it would be a good thing to spend five or possibly ten minutes in having some pictures thrown on the canvass showing what has been done by the use of the King Drag method in one of the counties nearby. I have arranged with Dr. McCaskey, a Supervisor down in Lancaster county, of whom I have often heard and of whose good work I have heard very favorable reports, to come here and throw his pictures on the screen, if it is the desire of the Board. Shall we have them or not?

(Several members responded in the affirmative).

MR. SCHULTZ: I must have one word more. I wouldn't want to accuse the Department of not doing what they can to protect the farmer, but they don't have the proper laws.

SECRETARY CRITCHFIELD: It wasn't necessary; I am not afraid of being accused. Now I have the pleasure of introducing Dr. McCaskey of Lancaster county, who will explain the pictures that are thrown upon the canvass.

## ROADS AND THE ROAD DRAG.

DR. McCASKEY: Mr. Chairman and Gentlemen: Last night in the paper we noticed down our way that the Governor had made a speech before this body and was open to suggestions relative to anything that could be done to improve the road conditions. In this morning's paper we noticed the same thought very much amplified and I jumped on the train and came up here with this suggestion to you gentlemen, and if you think it is worthy, I certainly believe it would be a very good opportunity for you to submit it to the Governor and to the Highway Department as a good practical remedy for helping to improve our local road conditions.

The whole purpose of road improvement is not going to be solved on a money basis; you can spend money from now till doomsday and won't get the roads, and you are not going to get the road condition entirely improved by legislation, because the great difficulty is that you have got to deal with Supervisors, you have got to deal with local officials who travel roads just like those you are looking at now. Now these roads—these pictures were taken some years ago right down in my county where I live and where I travel every day, and absolutely without avail were all my appeals to the local officials to fix things. They didn't know how.

Now, we have had some of the best brains and engineering skill that we possess. We have got Commissioner Bigelow, there's some of our good old Lancaster countians that know what they want but don't know how to get it. We've got Commissioner Bigelow and Engineer Foster and some more, some of the best engineering brains of the State, but the State Highway Department is not acquainted with what the farmer wants. There is where this whole proposition hangs, and I understand that the Governor said yesterday that he was open for suggestions as to how to raise money. Here's Mr. Herr from Lancaster county, and some other people, but you are not going to get roads by money alone, I want to emphasize that, and the only way you are going to get this thing going promptly is to avail yourselves and suggest and urge and keep on urging—bring it to the attion of the present Highway Department and the Governor as well to utilize the present township road law that we have.

That road law has been knocked and torn in pieces and hammered up and down and thumped as being a steal. It is not a steal, it is a good road law and I would just like to state here that the Highway Department didn't have anything to do with the formation of that road law, outside of occasionally being consulted relative to one or two of its minor measures.

A Member: Which one of the road laws do you mean?

DR. McCASKEY: The Township Road Law. The one passed at the last Assembly. In that road law, if you will read it closely, you will find in Section 2 or 3, that there's a paragraph, No. 7, that that paragraph authorizes the Deputy Highway Commissioner, who is Mr. Hunter, in the present instance, to call anywhere he wishes in the State of Pennsylvania, either a State Good Road Convention or a County Good Roads Convention or a Township Good Roads Convention. It seems to me that if that provision were utilized we could get—take, for instance, a township road convention right in my own community and in Mr. Herr's community—that picture is taken right on the border line between Mr. Herr's and my own—we could get a little local road convention here, there and at other places where there's a focus of good roads interests, and get road material men to study the benefits of road dragging, how to stand on a drag. The average farmer, when he takes hold of a drag, stands there like a stick, he doesn't appreciate the need of throwing his weight right on the front slab to cut off a hillock and throwing it on the rear slab to fill a hole. The first time I drove a drag, I used to sit down on it and one day the hind slab struck me in the back of the knees and I got my wife to sit down on it. Mrs. McCaskey thought the Good Roads Suffrage proposition was just as applicable as the political.

The thing I want to urge is that we do not have to pass a lot of new laws and do not have to raise a lot of money; we have got everything we need except good acquaintanceship. You will find, if you go through this State, among the farmers, that the average farmer is sore at the Highway Department; he is afraid. Why? He doesn't understand it and they don't understand him, and the quickest and most inexpensive way is to get this little simple provision worked through and have the Deputy Commissioner call these Good Roads meetings. If there isn't any official there that will take a job, the Township Supervisor Law authorizes the local County Superintendent of Highways to take a job. I thoroughly believe that all the thing needs is to have the Highway Department take hold of the proposition from the standpoint of the present laws and get out and get acquainted with the farmers, see what they want. That is the kind of roads we want the farmers to travel over.

When we have these good roads conventions here, there and the other place, so that the Highway Department officials and the farmers and all the good roads advocates who will be very much interested locally, will come and see just what you are looking at now they will understand that the first proposition of a good road is to get it well drained. You can talk money as long as you please and talk good legislation as long as you please, but you have got to get a move back of things and if you don't hit occasionally, the good roads proposition will hang just as it has done for some years. I have been all over the highways of France and England and know all about the wonderful roads that they have there, and we want them and are going to get them. I have been right in this thing for six years and been studying it tooth and nail, travelling the roads, understanding the farmer's obstacles and the little difficulties we have to contend with, and this is my suggestion to our State Agricultural Board, to put this thing right in tangible form, in written form, before you adjourn and submit it to the Governor and to the Highway Department. There's no us trying to jump a hundred years. Now that is a type, a condition; all that road needed was a little sub-drainage. The Highway Department has a lot of concrete plans and specifications, but how many supervisors out of our 1,600 in Pennsylvania understand how to interpret a blue print? I have been up against this proposition and know something about it.

A Member: What make of machine is that?

DR. McCASKEY: A Buick. All that road needed was an underground drainage pipe. We put it in and it did fine. After we got the proposition to that point, we put in concrete abutments under either end of the pipe and the road is as dry as can be. I walked over it three days ago and the mud is only half an inch thick when it rains. There is another easily solved roadway problem provided you put in tiled drainage. All that road needs is some tiled drainage put in under that ditch. There is the same, identical road after seven hours dragging by the patrol system. That's all right down in our country; the farmers understand what it means and everything needed is a little bit of boost from Harrisburg and some of that. Until we get that, the road proposition is going to hang.

That illustrates a picture of a roadway when you don't want to get on it with a road drag; that mud gets worked up into sticky glue and you can't do a thing with it, you can hardly get it off the drag, and you kill yourself and kill the horses. There is a typical specimen; all that road needs is a drag and a little drainage, and if our Highway Department would avail themselves of the present law and bring a convention right down on that road, even if there were only five farmers there—and there will be a good many more—the automobile people and other elements of the community will be interested and it will do a lot of good missionary work. There's the same road after seventeen hours dragging. I happened to drag this road myself and know some of the difficulties, and when I tell you that contour today has been changed so that the road sheds water right along for the past five years and is presentable at all seasons of the year, you can get some idea what the simple patrol system does.

There is one phase of the local road question I would like to explain, and that is jealousy. Occasionally there are many contingencies in a community, there are jealousies arise and the road drag is so simple and so easily made that very often folks think there's a "nigger in the woodpile" somewhere, they think it is too simple and wonder what is back of it. When I put the road drag on this work and finally fixed up this road, I created such hostility among some of our officials, that they went before our local court and obtained a temporary injunction restraining me from going ahead with the road drag. The road as you see it there is the way it was when I was prosecuted for fixing it. That shows you what sort of sentiment you have got to overcome sometimes. You see that rut there —that is two feet deep. Now the road drag will fix all that up and fix it up easily and quickly. It has been raining today a little bit; as soon as it would stop raining, the road would dry a little bit before it freezes. The road drag should be put right on there and fill those ruts in, and if the farmer is conscientious, he could drag the road four or five times and has got a good foundation, and every team that passes over will pack it harder.

I am not Supervisor any more, but I was for four years. We started this Road Patrol system working and at first, nothing having been done, it cost us more. I figured the thing out, kept every man's time and the days and hours he worked. It cost us $30 a mile the first year. The second year it cost us $12 a mile and the third year it cost us $5 a mile. We've got some sections of our country roads that the farmers haven't been conscientious as to whether they are as good as the others or not, but where a farmer is conscientious, where he continues to work his road drag, the road is just like a county fair race track. That illustrates the picture of a Sproul road that has been cleaned up, with its side ditches. There is another. Notice how readily it could be fixed up if, just once a year, the road grader was sent along and those side ditches cleaned out and sod thrown towards the fence. That illustrates a well drained road. That is the kind we want and the kind we have in some sections. There is a typical illustration of a seepy spot; that is the sort of thing every farmer in every township has, and I believe if the State Agricultural Board would just specify that road conventions be held in a practical way right out on the roadway and such spots as this be selected as a practical demonstration, it would do a lot of good. That illustrates a crow bar and shovel that are always necessary in travelling our country highways.

A young business man of Lancaster had this address the other night and I have tried to cut out most of the photographs that would be uninteresting to you gentlemen. There's a dog that knows almost as much about the country roads as some of us that have to travel them. There's the kind of county roads Mr. Bigelow and Mr. Foster want to give us, but we won't get them until we first get the confidence of the Department; so long as the farmer is afraid of the Highway Department, there will be trouble. There's the type of men we've got to get those roads through; what are you going to do with that man up in the middle? I have stood up three hours in the rain and argued with some of the people that didn't want to do ago; we procured an Amish man's services and gave him four miles of road to patrol and the farmers immediately said, "Sammy is working the township, he is making his living off the township?" You know how they throw it into people. But Sammy didn't bother but just kept busy.

The first year they found that this man's expenses were considerable, but the road was pretty well fixed up. The second year they found that the road was well drained and cost much less, and the third year, when he presented his figures to the taxpayers, everybody was quite satisfied; it showed it was the cheapest four miles of roadway in the township and the best, not even excepting macadam roads. There you have it, gentlemen, you can walk over that road or drive over it; it's a well crowned, well drained, open side ditched roadway that is respectable. It just goes to show what one Supervisor can do. If you drive through that road with a heavy load, you will not break your single tree or break your harness.

Another thought I wish to present is this: Why in the world should we teach our school children all about the great roads of the old Romans, etc., and not teach them any practical word on modern road conditions and needs? I would think if we could get a little local interest aroused in this proposition, if we could get some of our school teachers and Supervisors and directors to go out on some nearby community roadway and instruct the youngsters what it means to drain the road, show them the difference between surface drainage and underground drainage, they would become interested, youngsters now are not interested but they could be made interested. That illustrates what two hours' dragging did on the road we just looked at. That is just around the turn, about two miles away. There was, just before this road was dragged, there was a big farm wagon loaded with empty barrels struggling along through that seepy spot and the fellow got stuck. When this road was finally dragged he got his wagon out and his team started again, he went over this piece of road at a trot; it was the same, identical soil and everything. That is the kind of men we got to depend on if we are going to put this road patrol system into effect in a broad way, and, gentlemen, it can be done all over the State of Pennsylvania, just the same as it was done in my own local community. That is the type of road we all know; yet that road can be drained so that all the water will run off of it and stay off of it; and there is the type of man and there is the system that can be readily put into effect until we get the farmers' confidence and gentlemen when we get the farmers to trust us, we can have $200,000,000 voted in bonds, but you won't get it until you do get the confidence and trust of the farmer, and if the Governor and Highway Department really want a better remedy for local road conditions at present, I would urge, Mr. Chairman, that the State Board of Agriculture utilize this suggestion. I thank you, gentlemen. This is quite a dignified body and it has been a pleasure for me to come here and address you.

SECRETARY CRITCHFIELD: The pleasure certainly has been ours, doctor, and we feel under obligations to you for your address.

(The Board then took recess until 1:30 P. M.)

Thursday, 1:30 P. M.

Vice President S. C. George in the Chair.

The CHAIRMAN: First on the program this afternoon is the report of the Economic Geologist, Mr. Baird Halberstadt.

# REPORT OF ECONOMIC GEOLOGIST

## The Coals of the Pocono (No. X) Formation in Pennsylvania.

By BAIRD HALBERSTADT, F. G. S., *Pottsville, Pa.*

Notwithstanding the oft repeated warnings of Government and other geologists, extending over a period of upwards of half a century, that the Pocono (No. X) formation of Pennsylvania contained no workable coal beds and that prospecting in these rocks for them would result disastrously, the past year has witnessed the sinking of thousands of dollars in vain searches and attempts to develop coal beds of commercial importance, at geological horizons where they do not exist. Within the past few years, between $25,000 and $50,000 have been spent, to my knowledge, in the prospecting, developing and the purchase of lands immediately underlaid by the Pocono Sandstone formation whose place is hundreds of feet, geologically, beneath the True Coal Measures. In every one of these cases, the results have been disastrous; the financial expectations of the promoters have not been realized and the only reward was dearly bought experience. In view of this and the probability of future attempts to find coal beds of economic value in these rocks, it has been thought well to make this the subject of the Economic Geologist's report for the year. It is hoped that the warnings, so oft repeated, will be at last heeded. Years ago, there might have been some excuse for such prospecting, but there is none to-day.

In the advanced state of knowledge at the present day, it is no longer doubted, that the arrangement of the rocks was made in a definite and orderly manner and that it is but a useless waste of time and money to search for certain minerals in certain formations. In Pennsylvania, conditions favorable to the growth, deposition and preservation of the vegetal debris from which the substance we call coal was formed, were not fully realized until the arrival of that period of geological time, known as the Pennsylvanian. Carbonaceous matter may be found in the rocks of all our formations, but at no time in the geological history of Pennsylvania, prior to the Pennsylvania period, was the vegetation seemingly of sufficient luxuriance to furnish the vast supply of debris required in the making of a commercial coal bed. If it were, then conditions were unfavorable for its deposition and preservation. A careful study of hundreds of surface exposures of the rocks of the Pocono series, together with a like study of the records of hundreds of gas and oil wells drilled through this formation fail to reveal the presence of a single coal bed of sufficient size and purity to warrant exploiting it. Unfortunately, in attempting to correlate the coals found and which were, for some time, mined at the Tipton Run mines in Blair county, a serious error was made in assigning these coal beds to the Pocono formation instead of to the Allegheny series of the True Coal Measures, where they rightfully belong. This fact has been conclusively proven, both in indisputable paleontologic and stratigraphic evidence. This was the single exception pointed out where the Pocono coal attained commercial importance in Pennsylvania, and has sometimes been used, unfortunately, to support the claim that the Pocono coals in this State may, in some localities, be profitably mined.

As has already been pointed out, in every instance where the rocks of the Pocono formation have been examined, prospected and drilled through in Pennsylvania, the result has been the same so far as workable coal beds are concerned; namely: None have been found. Based upon evidence gathered from so many localities in so many counties of the State, it is believed that it is safe to say that, so far as our own State is concerned, all future attempts to mine these coals, will like those which have already been made, result disastrously.

That the subject may be more clearly understood, a table showing the relative position of this formation to others in the geological column and a brief description of the rock strata, comprising the Pocono series, will be given. Based upon lithologic and paleontologic evidence, the rocks forming the crust of the earth have been divided, sub-divided, and when warranted, these subdivisions have been still further divided, as will be observed in the following table:

## LIST OF THE GEOLOGICAL FORMATIONS OF PENNSYLVANIA

| Period. | Epoch. | Color and character of formation. |
|---|---|---|
| QUATERNARY, | Quaternary, | Glacial drift-peat and alluviam. |
| TRIASSIC, | Triassic, | Dark reddish-brown sandstone-upper beds, coarse conglomerate. |
| PERMO (CARBONIFEROUS) | Greene Co. Group, | Limestone, gray shales, sandstones and thin coal beds. |
| | Washington Co. Group, Monongahela River Series. | Sandstones, shales, limestones and coal beds—Pittsburgh bed at base. |
| PENNSYLVANIAN, | Conemaugh Series, | Red and green shales, sandstones, sporadic coal beds. |
| | Allegheny River Series, | Shales, sandstones, coal beds, limestones, iron ores. |
| | Pottsville series, | Conglomerates, sandstones, shales and coal. beds. |
| | Mauch Chunk Red Shale, | Soft red shales, red sandstones. |
| MISSISSIPIAN (SUB-CARBONIFEROUS). | Pocono Gray Sandstone, | Sandstone, shales, slate, olive gray, conglomerate and thin coal seams (False Coal Measures.) |
| | Catskill Red Sandstone, | Red sandstones and red shales. |
| | Chemung, | Sandstone—brownish-olive. |
| | Portage, | Shales and flagstones. |
| | Genesee, | Shales—black. |
| | Hamilton, | Shales—bluish-gray, weathering to brownish. |
| | Marcellus, | Shales—black, weathering to brown. |
| DEVONIAN, | Upper Helderberg, | Limestone, blue-sparry and chert nodules. |
| | Oriskany, | Sandstone—yellowish white crumbles into pure sand. |
| | Lower Helderberg, | Limestone (clayey flaggy) varying shades of blue. |
| | Salina, Upper, Middle, Lower. | Red shale, limestones (salt group). |
| UPPER SILURIAN, | Niagara, | Perhaps wanting in Pennsylvania. |
| | Clinton, | Red slates, shales, sandstones, iron ore. |
| | Medina, | Red and gray sandstones. |
| | Oneida, | Greenish-gray sandstone (conglomerate beds.) |
| | Hudson River, | Dark blue (carbonaceous) shale and slate. |
| | Utica, | Dark (carbonaceous) slate. |
| LOWER SILURIAN, | Trenton, | Limestone, yellowish-gray. |
| | Calciferous, | Dark yellow-brown. |
| | Potsdam, | Coarse, hard sandstone, friable sandstone—quartzite—fine white glass sand. Colors, brown gray and yellow. |
| | Azoic. | |

The formations containing carbonaceous matter, beginning at the lowest, are:

The Utica Slates.
Hudson River Shales.
The Marcellus Shales.
The Genesee Shales.
The Catskill Red Sandstone (occasional streaks.)
Pocono Sandstone—False Coal Measures—(Coal Beds Unworkable.)
Pottsville Series.
Allegheny River Series.
Conemaugh Series.
Monongahela River Series.
Washington County Group.
Greene County Group.
Triassic, New Red Sandstone.

The Pocono series, it will be seen on reference to the table above, forms the lower portion of and with the Mauch Chunk Red Shale (XI) comprise the Mississippian period. The strata forming the Pocono series is made up of alternating sandstones, shales, slates, conglomerates and thin coal beds, usually too impure for fuel purposes. The standstones vary in color; some are gray, others brown; the shales and slates are gray-dark, and in certain localities, especially near the bottom of the series, red. The formation varies, within comparatively short distances, in thickness from a few hundred to several thousand feet, hence a detailed description of it in one locality would not compare with a like description in another. For example, the series near Mauch Chunk is 1,253 feet thick, while in Huntingdon county, it attains a thickness of 2,133 feet. In speaking of it, the late Prof. J. P. Lesley, State Geologist, says:

"In composition, it is in one region a single mass of gard and massive gray standstone and pudding stone strata; in another region, a triple mass of current bedded greenish sandstone beds, separated by shales containing seams of coal; and in a third region, a man subdivided mass of thin sands and massive limestones."

It is, however, generally overlaid and underlaid by red rocks. The seeming resemblance of this series, at some localities to the Coal Measure rocks and the fact that this formation is underlaid likewise by red sandstone and shale has, no doubt, frequently been the cause of mistaking them for the Coal Measures.

In southwestern Pennsylvania, West Virginia and southeastern Ohio, this formation is the important natural gas horizon known as the Big Injun sand. In Beaver and Lawrence counties, it is known as the Berea grit from which both oil and gas have been produced. Outcrops of the Pocono Sandstone are found in Bedford, Blair, Bradford, Cambria, Cameron, Carbon, Center, Clarion, Clearfield, Clinton, Columbia, Crawford, Dauphin, Elk, Erie, Fayette, Forest, Fulton, Huntingdon, Indiana, Jefferson, Lackawanna, Lebanon, Luzerne, Lycoming, McKean, Mercer, Monroe, Montour, Northumberland, Perry, Pike, Potter, Schuylkill, Somerset, Sullivan, Susquehanna, Tioga, Venango, Warren, Wayne, Westmoreland and Wyoming counties. Thus, it is seen that in forty-three (43) of the sixty-seven (67) counties of the State, the rocks of this formation come to the surface, but in none of these localities, as has been said before, has a single coal bed of value been found. Prospecting for coal in this formation has been extensively carried on in Perry county and more recently Dauphin and Carbon counties, and in others, though perhaps on a less expensive scale. Near Duncannon, Perry county, Prof. Claypole more than thirty years ago reported that a tunnel two hundred (200) feet in length had been driven into Cove Mountain to two beds of coal, one 8 inches thick, the other 2 feet 6 inches thick. The coal here was poor and badly crushed. Analysis showed that it contained 36 per cent. ash. Such material is useless for fuel. Still another attempt was made to mine coal in Buffalo township near Mt. Patrick, by driving a drift three hundred (300) feet on the seam. No good coal was found from one end to the other in this draft. In his concluding remarks, Prof. Claypole says:

"The coal is soft and crumbles to powder between the fingers. No great quantity appears to have been taken out. No one seems to know much about it and all the spoil has been removed and used for embanking the canal." (Report F2, pgs. 153-155).

In passing, it might be well to add that the Pocono sandstone is not the only formation on which money has been thrown away in Perry county. Some 10,900 feet lower than the Pocono, in the geological column, there occurs a series of black shales called the Marcellus Shales. These rocks have also been searched for coal beds but, as in all other counties, complete failure was and always will be the result. In Huntingdon county, the Pocono formation has been divided into three groups by Messrs. Ashburner and Billin. The thickness of the three being 2,133 feet. About 600 feet from the top of the series, there come in no less than nineteen (19) streaks of coal and coaly material, none of which are more than six (6) inches thick. If all these were together, they would make a coal bed four (4) feet thick. The average thickness of the streaks is less than two (2) inches and they are found distributed through three hundred and thirteen (313) feet of strata.

In a tunnel on the South Pennsylvania Railroad, through Sideling Hill, Mr. F. H. Lewis reports that several coal beds about one (1) foot thick were cut in the Pocono. About one mile below Pottsville, the Pennsylvania Railroad cuts through the upper part of this formation. In this cut, several seams of black shale containing very small coal streaks occur. Diamond drilling was carried on extensively for some months in the Pocono formation west of Mauch Chunk in Carbon county, but nothing of economic importance, it is said, was found. Many years ago, a bore hole was sunk near the village of Monroe in South Union township, Fayette county, penetrating the Pocono. In this, a bed of coal three (3) feet thick was said to have been cut but there is doubt concerning this measurement, and it may be that it was but two (2) feet thick. Unfortunately, no description was given of the character of the bed, and as to whether it was of good quality, nothing now seems to be known. Exhaustive searches at the same horizon at Turkey Nest, four miles from Uniontown, and in the Conemaugh, Loyalhanna and Youghiogheny gaps, where the rocks are exposed, failed to show this seam, hence it is not unreasonable to assume that the bed is not persistent. In fact, the examination of the Pocono in Westmoreland and Fayette, have shown that nothing of economic importance in the way of coal beds has been found. At or near Lock Haven, in Clinton county, a thin seam of bituminous slate has been reported in one of the upper standstones.

The only seemingly successful operations in coals of the Pocono formations are in Montgomery county, Virginia, where one of the seams attains a thickness of nine (9) feet and, apparently, is continuous along its line of outcrop for twelve (12) miles. The coal, however, is quite high in ash. In Pulaski and Wythe counties of the same State, these coals are mined but the high ash constituent appears to limit their use to local trade. All attempts to mine Pocono coals in West Virginia appear to have been as unsuccessful as those in Pennsylvania. It is likely that the pernicious idea, unfortunately too prevalent, that black shale and slate will be found transformed into coal, if followed under cover or deeper is largely to blame and has induced men to expend both time and money in prospecting for coal in localities where there is absolutely no chance of finding it.

After a thorough study of the records of surface exposures, of drill holes, a personal examination of many of the exposures, and the experiences of others together with the knowledge of the conditions existing at this period of the earth's history gleaned from the rocks themselves, it is reasonable to assume that no coal beds of economic value will ever be found in the Pocono formation in Pennsylvania. Thousands of dollars have already been spent in vain searches, perhaps much more will be in the future, but that failure will result in every case is seemingly inevitable. In conclusion, let us cherish the hope that no more capital will be thrown away in these fruitless endeavors.

MR. STOUT: Can you tell any reason why, just north of the Blue Mountains, here in the Devonian System, we do not find oil and gas the same as they do west of the Alleghenies?

MR. HALBERSTADT: There are certain conditions that seem to be absolutely necessary over oil pools. Where you have the rocks on the high pitches, high angles, the outcrop comes to the surface. Now, the rocks are porous and if there is any oil there, it has volitalized and gone off as gas; and in the same way, if there has been any natural gas there, it has gone off, because these things come to the surface and work their way right out. The structure where they find these oil and gas wells is a rounded sort of a dome, a domelike structure, not that it is not solid beneath, because it is, but you see in that way the gas and the oil has no chance to escape and it is overlaid generally by a very close textured slate or shale, something from which the material cannot fly away.

The CHAIRMAN: If these are no objections, this report will be filed with the Secretary, and we will proceed to the next number on the program, which is the report of the Agricultural Geologist, Mr. Stout.

Mr. Stout then read his paper as follows:

# REPORT OF AGRICULTURAL GEOLOGIST

## History, Agriculture and Ginger

By Mr. W. H. STOUT, *Pinegrove, Pa.*

Mr. Chairman and Gentlemen of the State Board: If you take the map of Pennsylvania, you will find a section of country just about 40 miles east of here, Schuylkill county—a whole lot of people don't know anything about Schuylkill county, but we claim to be something of a county. We are among the first—Schuylkill and Luzerne—were the first two counties that came under the provisions of the new Constitution when we had more than 150,000 people in there, and you may be surprised to know that so much science came from one county. Here is my colleague, and here is one of the members of the State Board and some visitors from Schuylkill county. Now I want you to familiarize yourselves with Schuylkill county because you are paying a tribute to our coal operators, you are paying ten to fifteen cents a ton now for all the coal you consume that is taken out of our mines. We expect to get that money in our district to make good roads.

We have something else that we are not so proud of. Among all this population that I spoke of, we have 1,250 saloons. We have a magnificent courthouse and a big jail. We have an almshouse and an insane asylum and all three are full now. What connection there is between these saloons and the almshouses and insane people, I don't know, but I think they are closely connected. I have paid some attention, listening to these talks that we hear at our meetings here and elsewhere about the prosperous condition and the great crops they raise in European countries. Now, I have spent time and quite a considerable time to discover some of the reasons why these things are as they are. I just read yesterday in the last number of the Literary Digest, that in England the farm laborers get $4.50 and $5.00 a week for service. If we would come and offer our people $4.50 and $5.00 a week, they would laugh at us, but yet they are so prosperous over there—they raise double the crops we do, and why? I studied the problem and found that their conditions are entirely different from ours, their climatic and geological conditions and vast population gives them cheap labor that they can afford to employ in producing these large crops.

I have here, to prove the assertion, a paper that I collected just within a few weeks now, showing what the people do over there to make these large crops. Now the concensus of opinion of these different Experiment Stations, including that at Darmstadt, attribute it to the extensive use of fertilizers which runs from 50 per cent. to 70 per cent. It is surprising to know that those European countries use fertilizers even more extensively than we do in this country.

### THE REASON WHY

Out attention is frequently directed to the crops produced in European countries where, during the present generation, crops were greatly increased, nearly doubling the yield. Prof. Hopkins wrote to various European Experiment Stations for information, asking to what factor the increase was attributed, whether to the use of improved seed, to the use of plant food in commercial fertilizers and stable and green manures, to better rotation of crops, or to more thorough tillage:

Holland replied: "First—The proper use of commercial fertilizers. Second—The improved variety of seed."

England replied: "Much poor land left down in grass; less acreage cultivated. The extensive use of fertilizers and feeding stuffs, cotton seed, linseed cake, corn gluten and others. Improved seed and better tillage."

Germany replied, (Gottinger): "Fifty per cent. to artificial fertilizer. 25 per cent. to better tillage encouraged by larger crops. 15 per cent. to better seed. 10 per cent. to crop rotation."

Germany (Kalla): "Improved seed. The larger and more intelligent use of artificial fertilizer. The better tillage. The better rotation of crops."

France replied: "First—Fifty per cent. use of farm and commercial fertilizers. 30 per cent. better cultivation. 20 per cent. better seed, improved varieties. Second—Effect of fertilizer 70 per cent. Better cultivation 20 per cent. Better seed 10 per cent."

England, (London): "Improved tillage, drainage, use of lime. Increased manure from purchased feed, oil cake, etc. Rotation of crops and increased supply of artificial fertilizers."

Germany, (Bromberg): "The extensive use of artificial fertilizers. The care and use of manure. To green manuring. To cultivation of legumes. To better rotation."

Germany, (Koenigsberg): "Improved seed. The greatest use of commercial fertilizer in Germany than in any country except Belgium. Rotation of crops. Better cultivation."

Germany, (Darmstadt): "Best seed, deeper and intensive cultivation, green manures, the ever increasing use of artificial fertilizer."

Italy (Creelman of Ontario from address, Illinois Bankers' Ass'n.): "A country twice the size of Illinois, used about (1907) 1,050,000 tons of phosphate, 90,000 tons of nitrogenous fertilizer, and 7,700 tons of potash salts. Take one-third of potash exported from Germany, imports from other counties additional and uses upward of 1,000,000 tons or more slag phosphate."

When I tried to prepare a little something for this occasion, I didn't know how to head the article. I finally concluded to give it the title of Geological History and Agriculture. There is something else contained, however, that I didn't find any definition for in the dictionary; so I called it "Ginger." It is not to be expected that a plain farmer, in the period of twenty minutes, without any expected remuneration as an incentive, should inspire one to his best efforts. Volumes might be and have been published on every one of the themes of geology, history and agriculture, by noted authors; so it is difficult to produce anything new or original.

Geologically the earth has passed through various stages of tropical, semil-tropical, frigid and temperate climatic periods during which the various formations, a great variety of deposits of minerals and metals in the interior, and a superficial covering termed soil were formed. Investigations prove the same conditions to have prevailed on both the Eastern and Western Hemispheres, since the same rocks and soils are found in all countries. If the United States Soil Survey should test the soils in Europe, Asia and Africa, the same deposits of Dekalb, Upsher, Hagerstown, Frankstown, Lickdale, Conestoga, Volusia, Dunkirk, Norfolk, etc., would be found of sand, clay, loam silt and muck adapted to various crops, and known from experience what crops are best suited to the various localities. General Geology, one of the most interesting and fascinating studies is becoming more popular, and together with Astronomy is not considered so much in conflict wtih the Mosaic record as it was during the dark ages when philospһy and science were regarded as pernicious heresies. Superstition and bigotry retarded the advancement of scientific knowledge many centuries to the detriment of human progress and intelligence. Although we may fancy scientific agriculture to be a new science, it has been a study for centuries and many books and essays are in existence, such as those written by Varro, Cato, Virgil, Pliny and Columella. Since B. C. 116 to modern times, agricultural literature is extant. The Arabians were skilled in methods of irrigation, the use of manure, and the raising of improved breeds of cattle. Rice, coffee, sugar, silk, cotton, wool, leather, etc., were among the industries that engaged their attention, together with mining and metallurgical art, and the advancement of the sciences along other lines. The present generation takes pride in their accomplishments and progress, but that the ancients had attained to a high degree of efficiency is evident from the history handed down to us. The ancients attempted to erect skyscrapers years ago, but the first effort was a failure after forty years of wasted labor, through having such a variety of workmen and such confusion of languages so that the effort to reach the heavens failed and they had to give it up in despair.

During recent years, soil physics, soil chemistry and agricultural geology have received extensive attention by the National Government, the various States and individuals. Employing so many talented scientists and specialists on soil problems, the common tiller of the soil cannot hope to cope with the complicated problems involved in the art of agriculture, except from a somewhat superficial knowledge and experience. Perhaps all the farmers present have read and studied the publications on the subject, and this discussion may infuse a little enthusiasm and create a desire for additional knowledge about the earth and the fulness thereof.

In relation to the relative size of the earth, the soil, the support of all animal life during past ages and their dependence for the future, is that little film spread over the earth in the proportion of a layer of tissue paper over a grape fruit. It would be a great calamity to have a cataclysm destroy most of the creations of men's hands, however, if they had left the soil and a year's crops, the human race would survive and eventually reconstruct the machinery to restore to a normal condition the industries of the world. Having only two-fifths of the globe habitable, and that only in parts (the remaining three-fifths being ocean) there is relatively only a fraction of the globe suited to the production of crops for the maintenance of the human race, and if crops should fail for one single season the consequences would be too shocking to contemplate. The soil which we are tilling is the product of nature's laboratory, a restless chemist, ceasing neither day or night, in calm and storm, in heat and cold, ever active.

Since the earth has assumed form, the elements have been at work building up and destroying and ceaselessly changing the solid rock into fragments and again reuniting the particles to form new deposits. Geologically the soil is new, and fortunately while being lost it is also renewed by the same agencies that have been at work before the earth was habitable. Reflecting upon the fact that all living things, vegetable and animal that existed during the past ages, to within recent time have perished and yielded their remains to nature's cauldron, where all things are purified, separated and restored to their original elements, nothing lost, nothing gained, with the exception of what is lost by the improvidence of the human race and dissipated as waste in the oceans. Every particle of soil existed in the primary rocks, and in the air at some remote time in a gaseous or molten condition, which cooler in space, when all the minerals, metals and gases were separated according to their specific gravity and chemical affinity. It is a matter of temperature only that determined the separation of all the elements into their respective divisions.

Historically this hemisphere is called the New World, but geologically, it is the oldest continent on the globe, unknown to history until within a little over four hundred years ago. The inhabitants found here, maintained themselves upon nature's abundance of game, fish, fruit, berries, etc., with a few cultivated crops, not drawing upon soil resources to any extent and not concerned with national conservation problems of field, forest and mine. Considering the brief time that this country has been occupied by the Aryan race, they had no concern until recently regarding the future. It is now beginning to be realized that the extravagant, wasteful, almost prodigal and riotous living of the people of this country is creating a CONDITION, and not a THEORY to be met in the near future if the nation's prosperity is to continue.

Agriculture is recognized as the most useful and necessary industry, at the same time regarded as a menial, despised occupation, too degrading for the weary, shrewd, cunning and those of aristocratic tendencies to engage in. So long as this class find it more congenial and less tiresome to farm the farmer than to engage in tilling the soil, they would prefer preaching before practice. Farmers are patient, and anxious to learn how to improve their condition, but tire of listening to those language picture paintings offered them as bouqets, knowing that they are not genuine, without taste or smell. It is a laudable endeavor to stimulate and encourage the husbandman, but not with fables about corn raised at 10c a bushel; a quart of strawberries from one hill; 100 chicks from 100 eggs; 300 bushels of potatoes on an acre, and others of like nature, because they are misleading both producer and consumer.

The one universal problem now is the high cost of living. All sorts of reasons are advanced to account for it. The indolence of farmers, the surplus gold, the greed of corporations, the extravagance in public affairs, are some of the reasons offered, yet another is, that it is the high living that is expensive more than the high cost of living. The latter is a logical reason, but not the true one. The world's increasing population with little more unoccupied land to lay under tribute to produce cheaply the necessaries of life is a more potent but yet not true reason. With the great area of virgin soil, once considered inexhaustable, this country from its abundance supplied other nations and invited the oppressed from all quarters of the globe to share in the great wealth stored in the valleys, hills and plains of this country. The products of the soil have nearly reached the limit and soon will produce only what is needed by our increasing population. It costs money to restore fertility to exhausted land. An ounce of fact is worth a pound of theory, and an ounce of available plant food is worth a pound of insoluble material in the soil.

The true reason for the high cost of living is contained in the last census report and the year book for 1912. During 54 years up to 1912, the wheat and wheat products exported amounted to $5,884,000,000. About one-fifth of the crops went abroad. The value in dollars represents also the number of bushels, the price averaging a dollar a bushel, so that according to chemical analysis, the fertility value at 20c per bushel amounts to more than a billion dollars. During five years, 1908-1912, animal exports not including packing house products amounted to $108,691,102. In 1908—$34,101,289; 1909—$22,645,488; 1910—$17,447,735; 1911—$19,048,653; 1912—$15,447,987, a decline of nearly $19,000,000 during five years. This accounts for the high cost of beef. Cotton exports in the same period of five years amounted to $2,436,794,250. Cotton exports increased while grain and livestock diminished. The fertility value of all farm products is almost beyond computation, most of it was practically lost to our soil, being sent seaward through the sewers into the Atlantic Ocean, and no care taken of human voids anywhere as a rule since the country is settled. The crops produced on the farms of this country in 1912 amounted to over nine (9) billion dollars, raised on over six million farms. Dividing this vast sum among all the farms, averages $1,500 as the share of each. The average value of all farms is $6,500 so that the dividend for interest, taxes and all expenses for each farm is a little less than .025 per cent.

## WHY DO THE BOYS AND GIRLS LEAVE THE FARM?

To maintain the fertility of the soil is the problem now. The fertilizer bulletins from many Eastern, Middle and Southern states show that they are using commercial fertilizers in large quantities, costing the farmers much money. The great grain growing State of Indiana, in 1912, used $3,465,636.32; Georgia, the great cotton state, over nine million dollars' worth; the Keystone state, in diversified agriculture, probably nearly eight million dollars' worth. In Kentucky, there were 632 different brands registered in 1911, which is about one-half of Pennsylvania's registry. Increasing taxes, the cost of labor, fertilizers and other supplies make farming expensive, for which the consumer must pay. Eastern agriculture cannot much longer depend upon the west and south for cattle feed. The prices have already advanced on some products 100 per cent. and no prospect of getting cheaper. It is just a bit tiresome to read and hear some of the so-called experts calling farmers soil robbers, ignoramuses and advising, this, that, and the other about which they know nothing from experience. The knowledge they possess is obtained from reading theory by some would-be scientist, whose knowledge is obtained in pot culture in hot houses under abnormal conditions not applicable to practical agriculture.

There are certain periodic crazes sweeping over the country from time to time. Once it was silk culture, Belgian hares, skating rinks, baseball, football, and hobble skirts are some of the late ones, and the use of lime once so common that much land was completely exhausted by its constant use, is gaining favor. The victims of the Good Roads mania are convalescing, and there is hope for their ultimate recovery. Among the things recently advocated to improve the soil is the use of ground limestone, floats from phosphate rock, sulphur and rotation of crops. Experiments are going on testing the usefulness of raw material in agriculture with anticipated favorable results. Crop rotation has been practiced a long while, and there are numerous instances where withont resorting to sources outside of the farm to restore fertility, depending upon the common rotation of clover, corn, oats, wheat and grass, finally had only crops of cinque foil, mullien, dewberries and poverty grass practically rotating themselves out of house and home and only saved from becoming a public charge by selling out, or timely demise. An impoverished farm, dilapidated buildings, general unthriftiness does not appeal to the boys and girls. Driven in despair to seek more congenial environment, they look for more leisure, more pleasure and more enjoyment elsewhere. From the rostrum, counting house, publication bureaus, bankers, railroad presidents, executives, penny-a-liners, dailies, weeklies and periodicals, farmers are admonished to greater economy and efficiency, and to produce larger crops. Battling with the elements of heat and cold, drought and storm, sleet and hail, beetles and bugs, mites and lice, caterpillars and worms, blights and rots, mildew and rust, thunder and lightning, seemingly conspiring to destroy the fruits of his labor, while he eats his bread with the sweat on his brow, the farmer has learned within recent years that maximum crops are not remunerative. The fertility loss, extra labor and handling for reduced prices, sometimes less than the cost of production is no incentive to increase crops and does not appeal to the average farmer. If factories and furnaces, mills and mines were operated on the plan of maximum production and their products thrown upon the market like farm crops, it might help to reduce the cost of living and increase receiverships and bankruptcy. Farmers are not regarded as apt students, but with the school teachers and the Grange abroad in the land, they are absorbing some of the lessons taught by experience and intuition. The Grange is preparing to take charge of our Government and make it one of farmers, by farmers, for farmers, and the industrial classes instead of a Government by lawyers for special privileges and usurpers.

It is gratifying to know that the Administration and the State Board of Agriculture favor Woman Suffrage, the first step in that direction having been in admitting to this august body on equal terms with the members and the right to vote. When women have the right to vote and hold office they will help to make better laws, help to repeal some of the pernicious ones on the State books, and banish the liquor traffic from the country. It would be well to resurrect the old hymn and practice on it, "There's a Good Time Coming, Hallelujah."

A word of admonition before we separate and return to our several boarding places. Before dispensing tips, take particular care to use no finger bowls that are not thoroughly Pastuerized, sterilized and fumigated. There may be great danger of infection from all sorts of bacteria and germs, especially during Legislative sessions.

The CHAIRMAN: This report is also ordered filed with the proceedings of the Institute. We will now hear the report of Mr. B. Frank Wambold, of Sellersville, Chairman of the Committee on Cereals and Cereal Crops.

Mr. Wambold then presented the following report:

## REPORT OF COMMITTEE ON CEREALS AND CEREAL CROPS

By B. FRANK WAMBOLD, *Chairman.*

The year 1913 shows the highest value in all cereals—a grand total of 4,591,000,000 bushels, with an estimated value of $2,896,000,000—5 per cent. higher than any value ever reached before, 9 per cent. above the average of the five years preceding. This increase is due largely to the increase in the value of the wheat and corn crop.

### WHEAT

The largest wheat yield ever experienced in this country is recorded for this year—a total of 763,000,000 bushels, the value of which is estimated at $610,000,000. Pennsylvania alone raised 21,862,000 bushels on an average of 1,286,000 with an average yield of 17 bushels per acre. The year preceding showed an average of 18 bushels per acre, the value of which is $1,310,000 less—caused by the decreased production per acre as well as the decrease in the price (market) 95c and 91c respectively.

### CORN

The estimated value of this year's corn yield throughout the country far exceeds that of any previous year. The total value of the crop being $1,692,000,000—an increase of 12 per cent. in value covering a period of five years. The production this year was 2,447,000,000 bushels—the production having been exceeded in previous years. The drought throughout the corn belt being one cause—the loss of production being counterbalanced by the increase in the market price. The acreage in the country totals 105,820,000, of which Pennsylvania furnishes 1,463,000 acres, an average of 39 bushels per acre —3 bushels per acre less than the yield in 1912, due evidently to the late frost in June, which affected one-half of the entire State; the drought also in the central and northern part being a contributing cause, but worst of all was the early September frost, which killed the corn before it had matured, this covering half the area of the State.

### RYE

The production of rye in the State of Pennsylvania compares favorably with that of any previous year. The acreage being 280,000 and the yield 17½ bushels per acre—the estimated value of the product being $3,626,000. There was an increased acreage of 400,000, which is doubtless the basis of the increased valuation of the product, this year's yield being valued over 2½ millions in excess of last year's crop.

### OATS

With one-half million less acreage than in 1912, the yield of oats in this country was 300,000,00 bushels less, the decreased acreage being evidently the cause of this shortage in production. It is a products of every state in the Union. Iowa, Minnesota, Illinois and Pennsylvania being the chief states in the order given. The total yield in Pennsylvania was 35,774,000 bushels and the estimated value $16,456,000.

### BARLEY

The acreage of barley is the same as last year's—the average yield per acre being 23 bushels as compared with an average of 29 bushels in 1912—a decreased production of 45,635,000 bushels. The decrease in Pennsylvania alone was 10,000,000 bushels.

### BUCKWHEAT

The acreage of buckwheat during 1913 was decreased by 36,000—and the production also decreased 5 7-10 bushels per acre. The value of this product is estimated at $10,445,000, over two million dollars less than the value of this product in 1912. Pennsylvania, with a yield of 5,180,000 bushels and an estimated value of $3,781,000 easily leads in the production of this cereal.

### COTTON

Cotton is produced in only 14 states and this year's crop exceeds in acres that of the previous year by two million. Notice that there was a decrease of 7 9-10 lbs. per acre in production. The value of the crop is $797,841,000—an increase in the value over that of 1912 amounting to sixteen million dollars. This is due to the increased acreage.

### FLAXSEED

This product comes from ten or twelve states; North Dakota furnishes about one-half of the total yield of the country. The production of this State was 7,200,000 bushels. Throughout the country there was a decrease of ten million bushels this year as compared with 1912.

## RICE

This staple article is raised in 10 states. Louisiana excels in acreage and yield, 11,760,000 bushels were produced in this State alone. The total yield was 25,744,000 in the ten states and its value approximated at $22,000,000.

## THE HAY CROP

This crop ranks third in value as compared with other crops. The year 1913 has yielded 64,000,000 tons—a decided decrease over last year, which amounts to 8,000,000 tons. Many factors enter to cause an increase or a decrease. New York leads in the number of tons, Iowa follows, and next comes Pennsylvania, which raised 4,000,000 tons, valued at $61,775,000—nine million dollars less than the estimated value of the product in 1912. Hay is one of the crops to which the Pennsylvania farmer should give more attention. To increase the fertility of the soil it becomes necessary that clover be produced, not forgetting that the soil's fertility is the principal asset of the farm and farmer.

## PROSPECT

The acreage of wheat according to the fall report shows an increase of 8 6-10 per cent., the largest sowing on record. The acreage of rye is 1 1-10 less than in 1912. The conditions of these crops at present are exceptionally favorable and are prevalent throughout the entire country.

## CONCLUSION

Well may our country boast of its large fields and acres. Proud that it is still a large farm—when we remember that more of her sons are engaged in what pertains to the farm and its equipment as compared with manufacturing activities. How boastfully do we speak of a ten billion dollar crop of the year 1913. Well may we be proud of the productiveness of our soil. Let us, however, STOP and LOOK and LISTEN. The billions of which we speak represent a yield in tons and bushels—smaller, however, than in 1912, though the farms have increased to approximately 6,600,000 farms.

Intensive farming is becoming indispensable, and hence Brain and Brawn must be employed. We must give more to our soil if we would wish to take from it. We must study the nature and needs of it before we can with any degree of success harvest what soil is able to produce under favorable conditions. The population is rapidly on the increase and the tillers of the soil do not multiply in proportion. We need more for the cities and in order to supply those needs we must have more who are willing to take care of the soil which is to supply the demand. Though the farms show an enormous cash yield, let us not forget to note that 52 per cent. of farm production is never sold or put to the market; 20 per cent. of the actual farm production is consumed on the farm, which reduces the real cash sales by one-half. The average farmer has, on the basis quoted, an annual income of $900.00, out of which he must pay for maintenance and equipment, as well as taxes and help.

Since so much depends on conditions which are beyond the control of the tiller of the soil and since the factors which enter into making farming successful are so many and manifold, the co-operation of the consumer and farmer must be emphasized. Soil fertility is the one essential which needs the minutest attention. Let us hope that in order to encourage the farmer, the State and nation will seek means to furnish him with the necessary information and assistance. The agricultural institutions will become a special and important factor in the enhancement of soil fertility and the study of conditions and the protection of the farmer. Let us hope for improved avenues of efficiency in this very important item in our country's fundamental asset.

The CHAIRMAN: This report is also ordered filed with the proceedings. If there is one thing that makes the farmer sit up and take notice, it is that of taxes. Jones may pay the freight, but the farmer pays the taxes, and we will now hear an address on "The Farmer and Taxation," by the Auditor General of Pennsylvania, Hon. A. W. Powell.

Mr. Powell's address is as follows:

## THE FARMER AND TAXATION

By HON. A. W. POWELL, *Auditor General*

Mr. Chairman and Gentlemen: Your Chairman took part of my speech when he said that the farmer pays all the taxes, although I did not expect you to recognize that as anything new. In dealing with taxation, I am discussing the oldest subject, except the farm and the farmer, for so far as I know there never has been any time in the history of the universe that, close after the farmer, there was not the tax collector. And I believe that's true yet. Fortunately for me, however, I don't have to collect taxes directly from the farmer, for there are so many of you; but, indirectly, all taxes do come from the farmer; and your Chairman's statement is absolutely correct when he says that the farmer pays the taxes. The land produces all the wealth there is in the world. The land of Pennsylvania produces all the wealth there is in Pennsylvania, except that which has been drawn from the contributions of other people. We have natural resources such as coal, oil and gas, but all the wealth originally comes from the land.

The subject is so old that I first prepared a paper on the theory of taxation. I want to get my idea, and I want to get your ideas, for so long as I have lived in Pennsylvania—and I have lived here all my life,—I have found more real education and more plain common sense in the farmers of the State than I have found in any other particular class. I have been called upon to sit with those grouped about the table in political counsels, I have met great legal lights in the trial of cases and the making of arguments before the Courts, I have known famous politicians and great preachers and learned professors, but if I want to know what the people think, and if I want to hear the plain common sense of a proposition I try to go where I can meet some farmers. I want to say to you that the clearest, most clean cut explanation I ever heard of the matter of roads, which you have just discussed, was from a group of farmers in the little village of St. Thomas down in Franklin county. I went into the little hotel there and sat down behind the stove while dinner was being made ready, and those farmers talked for half an hour without knowing who I was. The supervisor of the township and a lot of other farmers were there and as I listened to them I thought I saw the common sense of the proposition.

I feel it an honor to be allowed to come here to talk to the farmers. I was raised on a farm; the first dollar I ever made was made on a farm, and when I got it I was wealthier than I ever had been before, and now, or ever will be again. That first dollar was the biggest dollar I have ever seen. Sometimes as I sit in my office in the cornor of this building I think that I am still connected with the farm in a way,—that I am a sort of farm animal; for the Auditor General of the State is a species of goat. He has the last say, and when a fellow has a proposition he hasn't been able to get through, he puts it up to the Auditor General, and then they send around to see if they can't get a warrant. The Legislature meets every two years and the members will hold all the bills back—I helped them to do it for two sessions—till the last. Then they pitch them in and pass them and nine-tenths of the bills are not read by one-tenth of the members. That is a fact and we may as well confess it. And then they don't know exactly what has been done. The Chairman of the Appropriations Committee tells the representatives of a hospital or some other institution, "Oh, yes; you'll get the appropriation you want,—"we'll put it in the bill." Then he forgets his promise—maybe it was only a political promise—and the appropriation isn't included in the bill; and then the friends of that institution come down to ask the Auditor General if something can't be done. They say, "Oh, well, what's the law between friends?" We have such experiences nearly every day. But you are not particularly interested in the troubles of the Auditor General. You are interested, however, in the subject of taxation, and vitally interested in that.

I want to take a few minutes of your time to discuss the theory of taxation. All of the expenses of government are lumped. The aggregate expenses must be borne by the aggregate of the people who are governed, who must provide the revenues to balance the expenses. Revenues are derived from two classes, one little class and one great class. The first, is that of voluntary contributions. Did you ever hear of a voluntary contribution to the expenses of government? I don't know whether any of you have ever made them or not, but last year there were $531.41 in voluntary contributions to the expenses of the government of Pennsylvania. They went into a fund we call the Conscience Fund. They just come in envelopes in cash, to the Auditor General; and when he receives money in an envelope that bears no name and contains no other enclosure it is taken over to the State Treasury and dumped into the Conscience Fund. When we get such a contribution we hope and believe that somebody is going to sleep better because that $50.00 or that $100.00 is in the Treasury of the Commonwealth. These contributions come in various amounts, but you need not bother about them, for voluntary contributions will not help you very much to pay the taxes.

The second source is involuntary,—the amounts you have to pay to the government. They are divided into two classes, the first of which includes the sums you have to pay for some special service the government renders or for some special privilege the government gives you. You pay for a special service when you buy a farm and go to have the deed recorded. The government of the State charges for the recording of the deed, so you pay a fee and fees are charged by the Secretary of the Commonwealth and by other public officers. The other class of involuntary payments includes those for special privileges extended. I know that farmers don't have any special privileges, and don't have to pay any license taxes unless they happen to be engaged in the sale of fertilizers. When I look over the list of receipts of the Commonwealth of Pennsylvania and find fertilizer license fees have been turned into the Treasury by the Department of Agriculture, and note receipts from two or three other license sources of that character, I wonder why in the name of common sense we tax farmers in this indirect way. Why don't we just go to them frankly and say, "Give us the money, and buy your fertilizers where you please?" In reality this is the tax on the farm, but it comes under the subject of licenses.

Leave aside those things for which you get some privilege or some service rendered and come down to the second class of involuntary payments or taxes proper. A tax is the enforced contribution of a citizen, to help pay the net operating deficit of the government. I say net operating deficit, for you will see at once that if for every service rendered him the citizen paid the government a price sufficient to cover the cost of that service, and if every man who was given a special privilege paid the full value of that privilege, you would not need any taxes. Wouldn't you like to see a day in which the government would charge the exact cost of services and privileges upon those benefited by them? No doubt you would, but that day never has been and never will be, so we may as well come down and discuss the question of how the government raises the money which pays its net operating deficit.

Leaving out the new income tax of the National Government, which I suppose not many of you are worrying about, inasmuch as it taxes only those incomes of $4,000 or over, there are two branches of government which collect taxes from the citizens of this Commonwealth; that is, the local government and the State government. During the last campaign you were bombarded with the statement that the farmer does not pay any taxes to this State. That is, because he does not just come up directly and pay cash into the State Treasury, he does not pay any State taxes. I do not agree with that, and never did agree with it. You pay taxes to the State and so does every body else who lives in the State. A citizen pays taxes either directly or indirectly. If he pays directly, he knows how much he pays; if he pays indirectly, God knows how much he pays. The ideal system of taxation would be that under which, after every service rendered by the government, and every special privilege extended by the government had been paid for to its full value, the net operating deficit, if there were one, would be paid directly by all the citizens according—and I want you to get this—according to the citizens' ability to pay, not according to any other method, or any other distinction. No man should pay taxes because he is so tall or so short or so fat or so lean, because he is a farmer, a manufacturer or lawyer, but because he is a citizen; and he should pay in proportion to his ability to pay. The burdens of government should be borne by those who are able to bear them.

That is not the theory of taxation in Pennsylvania under present laws. The theory of taxation in Pennsylvania is not that the man is taxed, but that the property is taxed. That is not right and it is not really true. The owner of the property is taxed even under our present system,—taxed to the extent of his ownership thereof. If the farmer owns the farm he is taxed to the extent of its value. The farmer, not the farm, pays the taxes. The farm is only a security for the tax, the government's collateral to insure that the tax debt will be paid. If it is not paid they pursue the farmer; and then the law still is, pursue the farm; and if there is not sufficient personal property upon it to cover the amount of the tax, they still have a right to take the farmer and throw him in jail. This does not happen often, but that is still the law. I was talking yesterday on this subject to the REAL ESTATE BOARD of the City of Pittsburgh, and Senator Flinn, who happened to be there, said, "There isn't any imprisonment for debts." I replied, "You may think so, but I would not advise you to take a chance on it by refusing to pay your taxes, because that still exists."

I think most of you will agree with the theory of taxation as I have stated it; that the tax should be upon the person and should be commensurate with his ability to pay. Here is a man who owns a farm, has a family of six or eight, and can barely make the farm support the family even though he is frugal and energetic. Adjoining his farm is one of equal value owned by a man with no family. I do not believe that the first man should be taxed as heavily as the second. He is performing his decent duty to society by raising a decent family, under decent circumstances, and I maintain that the correct theory of taxation requires that he be taxed less than his childless neighbor; that is, according to his ability to pay.

SECRETARY CRITCHFIELD: But suppose that one of these men, either the one with a family or the childless man has a mortgage on his farm for two or three thousand dollars?

MR. POWELL: The property should not be taxed as property, the man should be taxed as the owner of the property, and I cannot answer your question intelligently until you tell me which man is taxed upon which farm, or which man has the mortgage. If the mortgage is on the farm of the man without a family and he still has a surplus of ability to pay, he should be taxed; but the man who has a family, ought not to be taxed, even if he has no mortgage, if he has no ability to pay taxes without robbing his family.

A Member: "Who would be the arbiter for all that?"

MR. POWELL: I will concede that is a difficult question, but let me point out to you that the United States Government has assumed such a task in connection with the new income tax. Remember, if you please, I am dealing with a theory and am outlining an ideal. I do not say that the theory can be worked out absolutely, but I do say that it ought to be recognized by the government as a correct theory of taxation, and that government officials ought to work it out as completely as they can instead of aiming at the taxation of property instead of taxation of the man and regardless of what other services, aside from payment of taxes, the man renders to society.

DEPUTY SECRETARY MARTIN: If you can work that out, you will do a real service.

A Member: Are you going to make it possible.

MR. POWELL: I am not talking about making it possible. You are asking me to explain in a few minutes something that the wisdom of the ages has not yet worked out. I am not an omnicient man, but I can see along a straight line. But if you ask me to tell you how to walk in a straight line when civilization has constructed buildings on it and has thrown rocks in the way, and there are streams running through it with bridges across them to keep everybody from walking in a straight line, I can't tell you how it can be done. If I could work that out, I would be a great man. I wouldn't be standing here talking to you, but I would be consulted by all the governments of the world. No I cannot tell you just how to work it out, but I think you will agree that the citizen should be taxed, not the property, and that the tax imposed upon him should be assessed according to his ability to pay.

I believe that the man who lives in a house costing $100,000.00, when he has no need for a house so large and costly as that, is wasting society's wealth and is doing society an injustice; and I think you believe it too. A man has a right to that which he honestly gets and honestly uses, and if this principle had been written into the law, the farmer would be a hundred per cent. better off than he is today. In Pennsylvania we have a law that exempts from taxation all property employed in manufacturing. Will you tell me why that exemption should not apply to the farm occupied by a man and his family instead of to manufacturing property? Why should more than a hundred million dollars' worth of property in the county of Allegheny, in which I live, be exempt from taxation because it is used in the manufacture of rails and beams and things of that kind, which people cannot eat and cannot wear? Isn't that putting a premium upon complexity of civilization? I hold that it is, and I say that since this government's creation, we have been putting a premium upon complexity of civilization; that the governments of all the States or practically all, have been putting a premium upon getting away from the land. If anyone dissents from that, I should like to hear from him, for I am ready to prove it. The government of this State has been putting a premium upon getting away from the land, although the land is the only thing that makes any wealth in the world.

Perhaps I had better leave it with you just about there, or some of you will begin to suspect I am a farmer still. Unfortunately, I am not. I have an idea that sometime I should like to get back on a farm, but I don't know when that will be. There are a lot of other things to be done in the world, and I have got to do my share. I am the economical officer of the State government and I am just as busy trying to reduce the high cost of government as you people are in trying to reduce the high cost of living by growing more stuff so that you will get a less price for it. It always struck me as particularly funny for James J. Hill and other railroad men with millions to urge the farmer to raise more crops so that he would get lower prices for them. They never say that if a farmer will do as they advise they will reduce the freight rates. I am not trying to stir up any class sentiment, but you have got to consider your own interests and what is justly due you, and then fight for it. Fight for what is your due and never ask a penny more. If that rule had been in force in the railroad world, in the manufacturing world, in the general trust world of the United States, we would not be hearing so much about the high cost of living and other troubles that affect the farmer—and the public officials.

Now as to State taxation. The State does not tax the farm and it does not directly tax the farmer, as the owner of the farm. It taxes only those forms of wealth which take a corporate form, or taxes the owners of the wealth which takes a corporate form. It taxes under the guise of bonds, notes, certificates of indebtedness, etc., and that tax is four mills on the dollar. It also taxes capital stock according to its actual value, this tax being five mills on the dollar. Then it taxes certain public utility corporations, this assessment being in the nature of both a tax and a license and amounting to eight mills on the dollar of their gross receipts. Those are the millages paid by other forms of wealth in the State of Pennsylvania. It is true that they are sufficient to support the government as it now exists, and it is true that much of the property thus taxed is also taxed for local purposes; but it is also true that much of it is not taxed for local purposes. None of that owned by railroads, is locally taxed; and considerable of that owned by manufacturing companies, and some other classes of property, is not subjected to local taxation.

Such is the system of taxation in Pennsylvania at this time, and I hold that one of the great problems before the farmers of this Commonwealth is the securing of a just taxation. I do not use the words "equalization of taxation," which are heard a great deal in the northern tier of counties. You know from what I said before that I do not believe in equal taxes. Equal taxation would mean that each man would pay the same amount on its value. I do not believe in either theory. I believe that there should be some exemptions to an equal system of taxation, in order to work out actual justice; but I believe these exemptions should be so arranged as to offer a premium to industry, a stimulous to improvement and an encouragement to agriculture, which is the basic occupation producing wealth in this Commonwealth. I believe that if you ponder these things you will think the same way.

We should also make some reasonable exemption to the man for the service which he renders to society, and the man who is worth

$100,000, or $1,000,000 or $10,000,000, and throws his money around the Bellevue Stratford, or similar places, or spends his time on Broadway, should be taxed more in proportion than the man who owns a farm worth only $10,000 and does not find it easy to make it keep him and his family and give his children a decent education. He is doing his duty to society. I said this same thing yesterday at a meeting where the aggregate wealth represented in the room was, I should say, not less than $60,000,000, so you cannot accuse me of saying that just to you fellows. One man there was worth from $20,000,000 to $25,000,000, and he applauded as loudly as any of them; and there were some other fellows worth a million or so, and they admitted they should pay in proportion to their ability to pay. It is a man's surplus wealth that should be taxed,—a principle the U. S. Government recognizes in its income tax.

SECRETARY CRITCHFIELD: There ought to be an exemption to the man with ten children of a non-productive age.

MR. POWELL: Certainly; and if you don't do that, you will not only have to provide mothers' pensions, but it won't be long until you face a demand for pensions for fathers with a certain number of children. My contention is that justice in taxation is infinitely better than charity which is, in large part, perhaps, caused by inequities in taxation. Why should we run around the block to get back to where we started? We are winding ourselves up in an amazing theory because our fathers said that property, not people, should be taxed; because our fathers made a Constitution which nobody understood when it was made, and which the Courts have perverted since, and which has resulted in inequity to all of us.

A Member: How about a farmer whose improvements, costing $100.00 is put down by the Assessors as worth $500.00?

MR. POWELL: Well, if the improvement is made from surplus income, and the farmer does not need its product to keep his family and do his decent duty to society, he should be taxed for it. If he does need it, he ought not to be taxed for it.

A Member: Who is to be the judge in cases such as that?

MR. POWELL: That, gentleman, is the ultimate question for society. Of course, every man would like to be the judge of his own taxes. I cannot tell you who is to be the judge, but I hope it will be honest public official who keeps ever in mind this fundamental principle of taxation,—that it is the person who should be taxed and that he should be taxed in proportion to his ability to pay, and not in proportion to anything else. If there should be any exemption it should not be because of his relation to the assessor not because standing in society or the fact that he wears fine clothes and can of his service to some political organization, and not because of his "get away with it" when he makes his appeal.

A Member: When a farmer makes two blades of grass grow where one grew before, must he be taxed to pay for the man who can't make even one blade grow?

MR. POWELL: No, that's not it at all. If the farmer who makes two blades grow where one grew before, needs that extra blade of grass for his family, and to carry out his decent duty to society, he is entitled to it and should not be taxed because of it; but if he does not need it for these purposes, that extra blade represents surplus wealth and should be taxed. In this last case the farmer ought to be glad to contribute to society in general and to help along the poor man who cannot produce so much.

A Member: I'll vote for you for Governor.

MR. POWELL: Gentlemen, I have got a job now and it's a pretty big job at that, as you will understand, and I am trying to learn something about it; and that's the reason I came here to talk to you. I wanted to know what you thought about it. I am testing this theory out and I want your ideas, for you are the people who must decide what our laws shall be.

I am going to ask you to do something. In Article 9 of the Constitution of the State of Pennsylvania you will find all the Constitution says with regard to taxation. Look it over and see what amendments you think ought to be made. I think it is constructed on the wrong theory, and I want your opinion about it. Don't approach this like the average judge. I have some friends who are judges, and I studied law at Yale University, and I know that judges and lawyers look at a Constitution as if they were a little afraid of it. Constitutions are not sacred. Our fathers made ours and our children will have to live under it if we don't change it. So far as I am concerned, I would rather see it changed while I can have something to do with it and can at least use what little effort I can to see that it is done on the right principles, so that the people who come after me may get a square deal. I am not worrying about my square deal; if I don't get it I will go out and fight for it, but it is my desire that those who come after me shall have a little better chance to get it than you and I now have.

The CHAIRMAN: This address will be filed. Next is an address entitled, "Progress in the School and on the Farm," by Dr. N. C. Schaeffer, Superintendent of Public Instruction.

. SECRETARY CRITCHFIELD: I believe Dr. Schaeffer is not present, and I happen to know Dr. Houck will have to be over a hundred miles from here this evening and I will be very glad if he should be called next.

MR. KILLAM: Mr. Chairman, the Roads Committee, which was instructed to report this afternoon, are now ready to make their report at any time.

SECRETARY CRITCHFIELD: I think we'd better have Dr. Houck's address first.

The CHAIRMAN: When I was a young man teaching school, attending teachers' institutes in the county, there was one man more than any other that we liked to see come to the county institutes; in fact, the teachers' insitutes of Indiana county were not thought to be very much unless we had one of the Deputies, one of the members of the Department of Education, with us at that time. It was some forty years ago. I make that statement because you will hardly think that either he or I am that old. Now I have the great pleasure of presenting to this body my friend, Hon. Henry Houck, Secretary of Internal Affairs.

## BETTER SCHOOLS A PRESSING NEED OF AGRICULTURE

By HON. HENRY HOUCK, *Secretary of Internal Affairs*

Mr. Secretary, Mr. Chairman, and Members of the State Board of Agriculture: I am afraid that I am interrupting the regular business; if so, I shall not take up very much time. Way up in northern Pennsylvania I had a friend who is not living any more, but he was a great teacher. He had an academy up there and he sent hundreds of boys and girls to colleges and higher institutions of learning. They honored him all over the county and in a number of counties, and whenever there was an educational gathering, they would send for him to preside, they wanted to honor him; but this man was a little unfortunate whenever he got on the floor to speak. He was a great teacher in the classroom, but a little timid and backward when he came to talk to an audience. At one educational meeting, when called upon to preside, he started by saying, "If there are any directors in the audience, I wish they would come forward and sit on the program."

Now, in reference to being introduced, I am very much obliged to the President for those kind words he spoke about the Deputy Superintendents. In northern Iowa, I was introduced to an audience; the Superintendent was called out and he called on a young man to take his place, and when my turn came, he said: "The next number on the program is Mr. Henry Houck, who will try to entertain you." I have been introduced in all kinds of ways and in many states, but I never feel more at home than when I stand before a body of teachers with whom I have labored so long, and I am glad to see my old friend, Dr. Critchfield. He was a county superintendent too, and so was I, and, brother, we were superintendents when they had superintendents.

Now, the school business, of course, will come in right here because that has been my life work, and I'd rather teach school today than do anything else; but it don't pay. It's in the same position that farming seems to be and so I have taken another job, but I'd rather teach than do anything else.

They tell the story about an old teacher who had taught fifty years and he was poor—did you ever hear anything like that, a teacher who had taught fifty years and was poor—and the community took pity on him, they thought they'd give him something, and they elected him squire, so he opened an office in his house and waited for clients to come. One day a constable brought in a man, had him fettered and bound, and the old squire looked up and said, "What have you got that man here for?" "Why, I have arrested him." "For what have you arrested him?" "I arrested him for bigotry." "What's that?" "Why," says this man, "he has three wives." And the old squire and teacher said, "Gracious, that isn't bigotry, that's trigonometry." So you see that the old business would stick out fight away.

First, I will say what I would want to have taught in a good school, I would insist, in every good school, that the common branches be taught thoroughly: Orthography, reading, writing and arithmetic, and geography and grammar first and above everything else. I have had much to do in the examination of schools—normal schools. I have helped to examine thousands and thousands and the weakness was generally found in this fundamental work. On examinations, teachers do pretty well in algebra, geometry and some of the higher branches. Very many of them I found poorly prepared in this fundamental work, and every boy and girl that goes out from the public schools that is not thoroughly grounded in the fundamental branches is a failure and will be a failure all through life; so that's number one.

Inspectors in civil service work and the Postoffice Department and college presidents tell me—I hear it from every side—that applicants come to college and normal schools and in examinations for positions in the Postoffice Department and civil service fail in this very first branch—orthography. What a pleasure it is, my friends, to take up a paper, a manuscript prepared by an applicant where all the words are properly spelled and the capitals are right. You are ready, right away, to vote for a person like that, so that is the thing that, first of all, I would have thoroughly taught.

Then, next after that, if it is a school in the country, I would have agriculture taught. I worked hard on a farm. My uncle had a farm of 150 acres. We didn't have any, but I knew that farm so well—I knew every shade tree on it. I worked hard on that farm. The twenty-first day of June, that's about the time we took the scythes and started to mow, and if I could make $30 by the time the crops were gathered, I had done well, and that was pretty hard work—much harder than it is now. My father used to call me early in the morning. I often went out with him to plant corn. I trotted ahead in the furrow and dropped the grains of corn and father followed me with the hoe—and sometimes with the handle.

I tell you what we used to have: We'd got out to the farm about four or half-past four in the morning, and the first thing the farmer would tell us, was, "There's a load of hay in the barn to be unloaded before breakfast." I tell you, that was no slow business, that was the hardest work in the whole harvest to me, unloading hay. I didn't always stand on the wagon to throw it off, but sometimes back in the mow where there was no ventilation and the man threw it in so fast that I would be nearly buried; but then we had a great breakfast—scrapple and mush and buckwheat cakes—how they vanished—and country sausage. It was great! There are many good things about the old times. Then about nine o'clock came an extra lunch. We'd gather under a walnut tree that shaded a whole acre—and where are the old walnut trees? Right up where I used to work, there used to be two or three great walnut trees in every field; now they are all gone. That's where we used to sit to eat the ten o'clock meal and I got pretty tired by eleven and very often I looked up toward the porch for the hired girl anxious to hear her blow the horn. Oh, what music that was! At the very first peal, I dropped everything and then we had a grand dinner and went out again, and about half-past four, we had what they called supper, and then, when it was a very generous farmer, he would call us up late in the evening and give us another little lunch. Those were great, old times! I tell you what, we are missing so much in these days.

There are three things we are missing very much. There were many good things in the old times. First of all, I'd name the old singing school. The music was so easy, you could tell the notes by their shapes. They didn't all look alike. And how easy it was to learn and how we did sing! Well, now, what's the next? The old spelling matches! The parents would come out and we'd pick our sides and oh, how we learn to spell! Why, these old common branches I sometimes think were taught more thoroughly in the older days than now. One of the reasons is that they didn't have so many branches to teach, and I notice that some of the most progressive states are bringing back the old spelling-bee. And the social side was good, it brought the young people together. What was the other? Perhaps this is the best of all, and it's gone, and that's the old debating society. I have never been an orator and I suppose I never will be, but I wouldn't give for anything the little practice I had in the old red schoolhouse, standing up and debating, "Which is the Greater Evil, Slavery or Intemperance?" As far as I remember, my side always lost. There sat the judges and the critics and the people would come out, and young men would start, boys would start, at 14 or 15 years of age, some of them young, and break down in the first sentence, for they were so timid, but they grew and progressed rapidly and before the term was over, they could stand up and talk to an audience, and talk well. I tell you, the debating society of old was a great institution of the country and brought out many a young man and taught him how to debate and how to act before an audience.

Now I see Dr. Schaeffer has come in, and what I don't know about this subject, he does. I'll tell you about this old-time school—they taught only three common branches. Often we say there were three branches, the three R's, but I think there were four; there were reading, writing, arithmetic and a branch from the orchard. Now, I am glad that the last has passed away. I would never vote to locate a schoolhouse near an orchard. I went through it all. That orchard was right back of the schoolhouse and many a rod I brought that was used on my own back, and yet I won't say one word against the teachers of the olden times. What a battle they had to fight, what difficulties they had to meet, what opposition there was to the public school system! They worked for poor wages; they had many obstacles to meet and many battles to fight, but, in the face of them all, they laid the foundation for our school system deep and strong. All honor to the educators, the veterans of the olden times.

Arithmetic was always my weak point in school, the arithmetic lessons bothered me a good deal, and it was very unfortunate, too, because I went to an old teacher, and arithmetic was a grand thing in the old-time school and there was an understanding that if a boy could work arithmetic very well, he could go over to the girls' side and help them. Very often Will Toms, who afterwards became a doctor and was on General Rosecrans' staff, would go over and stand with the girls and it took him very long time to explain the problems, and I had to sit at my seat puzzling with arithmetic. I got in wrong on arithmetic at the first; I got into a class that I wasn't quite able to go with them, and that multiplication table even bothered me, especially that ninth line. I used to tell the others, when it came to the tens and elevens, "Take a rest, and I will help you out on that," and I have noticed that it is the habit of boys and girls in school to say, "Nine times four are thirty-two." I did it until the teacher got tired of it and called me up, and they had no chairs then, but he had a bench, and put me over the bench and adjusted—is that the right word?—adjusted me or balanced me on the bench, then took the ruler. That's a strange position to put a boy in, to teach him multiplication, but he brought down the ruler and said, "Nine times four are thirty-six." I knew it the first time and have never forgotten it since.

We ought to teach boys and girls to work in school. Do you know there is a tendency in these days to make everything too easy? The teacher that can make it easy and does all the work himself is in demand. I tell you, it is a great privilege to a boy and gives him a great deal of pleasure when he feels that he has done a thing himself. But in these modern days, that teacher is considered best who paves the way and makes everything easy, and it is a very unfortunate thing. The best thing boys and girls can do in school is to learn to study and work themselves. A little verse comes to my mind here:

"The heights by great men reached and kept,
Were not attained by sudden flight,
But they, while their companions slept,
Were toiling upwards in the night."

The boy that sits up in the evening and the girl that works out the problems with the right kind of suggestion and leadership—those are the boys and girls who are going to make their mark in the world.

What next, should be to teach the scholars good manners. I love to think of the old-time school when the boys and girls came in the morning. Did you ever think of anybody rushing in without greeting the teacher? "Good morning, teacher." "Good morning." I sat at my desk writing my copy and it gave me cheer for the whole day. Some couldn't talk English at all but they managed to say "Good morning, teacher," and when the school was ready to be dismissed, some had a courtesy; I wouldn't insist on anything like that now; I am talking of the spirit of the thing. Every one turned back and said, "Good evening, teacher." And that is not the end of it. When they met the poorest man on the streets who was hammering stones, a poor man who was getting perhaps fifty or seventy-five cents a day and had a hard lot in life, not a boy or girl would pass by without say, "Good evening." Oh, those are beautiful things, beautiful things! Sometimes when I look about and see boys and girls rushing and the way they go and the way they yell, I almost wish that we had some of the good, old manners they had in the days gone by.

I will tell you a little story; you look so serious. This is true, this really happened, this happened in Philadelphia. There was a boy going home and the teacher came by in the evening and passed the house while this boy was playing in the yard and in rather rough language the boy said, "Go to hell." And the teacher said, "Never mind, tomorrow I'll settle with you," and three or four days later, the boy came back and went up to the teacher crying. "Oh," he says, "teacher, don't punish me, don't punish me, I'll never do it again. I thought we were moving away." Well, I think it's a good time to stop, for I have another engagement tonight, but above everything else, don't let us complain.

I stand before you this evening, almost the last day of the first month in the year, and I tell you what's in my heart; this is the best hour the world has ever seen. The best hour. There never was a time when there was as much good done in the world as today. There never was a time when the farmers had a better time than they have today. You can't take up a magazine that don't treat about farming. Look at all our journals. Look at the farmers' institutes that have done so much. Read the papers, read the proceedings. Crowded audiences wherever they go. I don't know of any one subject more prominent in the minds of the people today than farming. There are better days coming yet. We have so much to be thankful for. I often wish I could hear that man lecture again who lectured all over the country. I refer to Dr. Willett, who passed away, not a long time ago. He had a lecture on Sunshine. Don't forget your blessings. Perhaps the first fifteen or twenty minutes he talked about the sorrows and troubles of life, and they were pretty bad, and then he turned one page and said, "This is what we have to be grateful for." He did a vast amount of good as he went up and down.

And then we have the great State College. That's a wonderful institution. I go into a great many states and I want to tell you that the State College, in my mind, compares favorably with any I have seen. There our young men and young women can go and get almost anything they want to study and I say, we ought to be proud of that and of our public school system under the leadership of my old friend, who sits before me and who has made his work such a great success. I refer to Dr. Schaeffer. There's much to be grateful for; let us be happy every day of our lives that we live in the year of our Lord, 1914, the best year that the world ever knew.

The CHAIRMAN: The address of the Hon. Henry Houck will be received and filed with the papers. The best crop we raise on the farm is our boys and girls, and the education of them is something to be considered and we will now hear an address on "Progress in the School and on the Farm," by Dr. Schaeffer.

Dr. Schaeffer then addressed the Board as follows:

## PROGRESS IN THE SCHOOL AND ON THE FARM

By DR. N. C. SCHAEFFER, *Superintendent Public Instruction.*

My friends, I used to imagine that I was a younger man than Mr. Houck. Somehow Governor Stuart got me onto that notion. Governor Stuart told us that when he and Mr. Houck and the others who were running for office were in Western Pennsylvania, a gentleman, upwards of ninety years of age, came around and said he wanted to see the politicians. They introduced him to Governor Stuart. "No," said he, "it's that man Houck I want to see." "Why do you want to see Houck?" "Why," said he, "when I was a very little boy, I used to go to school to him." But when a man pretends to talk of the olden times and says nothing about the apple butter parties and corn husking parties, etc., he must belong to a younger generation.

I am booked to talk to you upon "Progress in the School and on the Farm." It is a sort of self-evident proposition which everybody accepts that Progress on the Farm and Progress in the School should and do go hand in hand; but the trouble is that the proposition is accepted as a kind of a blanket term covering a sort of a general notion that we have, and in many instances we are afraid to analyze the proposition. We do a great deal of that kind of thinking in the educational world. If you put above the door of a school the word "Vocational," everybody accepts that as an up-to-date school, and yet they may be wasting the taxpayers' money at a terrible rate. The United States Commissioner of Education told me the other week that the American people are in danger of wasting $20,000,000 in useless experiments in agricultural and vocational education, and I think the time has come when, like men of common sense, we ought to look at the bubbles which people are continually blowing in the name of vocational education. Very often when you price the bubble and show its nothingness, people see how the money of the taxpayer has been wasted. A professor in Columbia University recently visited the schools of domestic science in three states. He found them teaching the girls how to make fancy cakes, how to cook dainty dishes, and he went home saying, "95 per cent. of it isn't worth a copper. It does not teach girls the essentials of home-making, or cooking, or housekeeping."

The most serious thing has recently been re-emphasized by the figures of the last census. We have all known about the drift of population from the country to the city, and in spite of all that our agricultural colleges and our farmers' institutes and our public schools with agriculture in them have been able to accomplish, this drift seems to go forward more rapidly than ever before. The drift was greater in the last decade than it has been in any decade for the last fifty years. In the years between 1870 and 1880, there were about 100 counties in the United States that had lost population in that decade. In the years between 1890 and 1900, there were 378 counties that had lost population, and in the last decade, that is, from 1900 to 1910, 798 counties, more than one-fourth of the counties in the United States, showed a decrease of population on account of this drift from the country to the cities. Isn't it time for us to sit down and ask what are the factors bringing about this drift of population from the rural districts to the crowded centers of population? And what makes the problem so very serious is that the last census indicates a less aggregate product in foodstuffs. Between the years 1900 and 1910, the United States produced less corn, less oats, less potatoes, less wheat, and, I understand, less in the way of cattle for the market. The yield per acre has increased; the value of the farm products has increased, but the total production has diminished, while our population has been growing rapidly. There can be only one outcome, namely, increased cost of living.

What seems to be a still more serious problem is the thing that Governor Eberhardt brought out about a year ago in World's Work; there was a dearth of farm hands in the State of Minnesota, and the Governor visited the twin cities, Minneapolis and St. Paul. The benches in the parks were crowded with men out of work, some of the men who were starving, and he went up to these men and asked them whether they wanted work. Oh, yes, they said they could do anything. Well, he said, "You are the men I am seeking. We need so many thousand hands upon the farms." Immediately they became glum. "Go to the farm?" They said. "Why, you've got nothing there but work, no amusements, no evening entertainments. We prefer to stay in the city and starve rather than go to the farm where we will have nothing but work." The truth is, with this drift of population from country to city, there has come about a state of affairs under which the inhabitants of the city are no longer willing to work upon the farm.

What are the factors that have led to this drift from the country to the city? I think that as farmers whom you cannot fool on very many questions, the time has come for us to face this state of things in a serious, common sense, way. Usually when anything goes wrong in the country, the blame is put upon the schools, and when any reform is to be brought about, it is put up to that school teacher who is working for forty or fifty dollars a month. The reform which the newspapers and the churches and the itinerant lecturers and the special associations cannot bring about, is put up to the school teacher, and she is expected to bring about the needed reform. I am prepared to admit that the school is one of the factors which has helped to bring about this drift from the country to the city, but it is not the only factor. So long as the shop, the factory, the store, the counting house and the railroad pay better compensation for work during less hours than the farm, so long this drift from the country to the city will go forward. The introduction of machinery is quoted by one of the latest books on vocational guidance as one of the causes for this drift. This book says that through the introduction of machinery, an acre of potatoes, which used to require 38 hours of work, now only requires 9; that an acre of oats, which used to require 66 hours of work, now only requires 7 hours of work; that an acre of hay, which used to require 21 hours of work, is now managed by 4 hours of work; and that in the production of wheat, the number of hours needed to work an acre of wheat from sowing to harvest has been reduced from 61 hours to 3 hours. Of course the introduction of machinery makes it possible to run the farms with fewer hands, and it is not surprising that there should be this drift from the farm to the city, where it is supposed that the factory gives us good wages all the year round. But I come back to the school. I am prepared to admit that the school is partly to blame for this drift from the country to the city. Why? In the first place, the ideals which the school has inculcated have pointed a way from the farm. What I mean I can probably best bring to your attention if I tell you of a new series of readers that has been prepared for rural schools. In this new series of readers the attempt is made to glorify farm life. George Washington is represented not primarily as a general, not primarily as a statesman, but as a farmer; that is what he was by vocation. There is a biography given of Thomas Jefferson who, by vocation, was a farmer, and one of whose greatest achievements was the inventor of a new plow which probably deserved to rank with the Declaration of Independence. There's a chapter on Cincinnatus, who was called from the plow to save Rome from a foreign enemy; and then, after glorifying farm life in that way, this series of readers goes on to tell how some city people who were stranded in an automobile on the old farm began to talk to the boys and girls about the attractions of the city. The boys and girls on that farm were all anxious to sell the farm and move to the city; and then the book goes on to tell how they began to work in the factory, how their cheeks became pale, how one of their number went off into consumption and how, when it was too late, they found the dreadful mistake they had made. That series of readers, from beginning to end, glorifies farm life, points out the nobility of the farmers' vocation, points out the redeeming features of country life as compared with the city. I want to raise in your minds the question whether it is not worth while for us to hunt up series of readers of that sort for introduction into our rural schools? If I were not State Superintendent, I would tell you the name of that series of readers, but under our peculiar law, I cannot have anything to do with the introduction of books, so I simply draw attention to that series of readers in this general way. I am thoroughly convinced that the ideals which we inculcate in the rural schools should be changed, and that the boy in the country should not be made to believe that if he is to rise to distinction and satisfy his ambition, he must necessarily leave the old farm and go to the city to live. Undoubtedly the growth in the yield per acre of wheat and corn, potatoes, etc., is due to farmers' institutes, to the spread of agricultural knowledge from centers like our State College and from our Department of Agriculture at Harrisburg. I tell you these corn clubs have been so successful in raising a crop, that a corn has grown even on one of my feet during the past year, and that's the only argument I have ever struck against the very successful corn clubs which are being encouraged all over this Commonwealth. The truth is that the spread of that sort of intelligence pays, and I am thoroughly convinced that we need the establishment of a new type of high school for our rural districts.

It is easy to waste the taxpayers' money by fruitless experiments. There is one man connected with the School Department whom I have sent all over the United States in order to find out the best and most efficient work in that line, and he is ready to give advice and to help any community in the establishment of agricultural high schools. I am thoroughly convinced that where agricultural high schools of the proper sort are maintained, they will help to stop this drift from the country towards the city. There is, however, another phase of this question to which I would like to draw attention. Twenty years ago the annual school appropriation was raised to $5,000,000. Later it was raised to $5,500,000, on account of free text books; and at that figure it remained until Governor Stuart was inducted into office. He conceived the idea that, as the rural population and the population of the State grows and as the needs of the rural communities grow, this school appropriation should increase; and through his efforts, $4,000,000 were added to the biennial school appropriation, raising the amount appropriated biennially from $11,000,000 to $15,000,000. With the best of effort, we have not been able to get the amount raised beyond that figure. Now, let us not deceive ourselves. Good schools cost money and the money can only come from two sources, from local taxation and from legislative appropriation. The question of local taxation is for the local community to solve, but the question of legislative appropriation is a question to be solved here at Harrisburg with the support of the people who send the members here. At the last session of the Legislature I tried hard to get the $5.00 a month added to the teachers' salaries provided for in the school code. It would have taken $1,600,000 to pay the $5.00 additional all over the State; I couldn't accomplish anything. Then we tried to have $1,000,000 added. That passed through the House and through the Senate; but the last Legislature was a triangle; two sides of the triangle representing the old parties and the third side of the triangle representing the new party, and as long as the three sides of the triangle stood against one another, there was no legislative progress. Finally, as the session moved along, the members saw that such a condition could not last if they wanted any appropriation for their home institutions. The policy changed. Most of the members got all they wanted, and when the appropriation bills came to the Governor, $20,000,000 had been appropriated in excess of the revenue. Well, no Governor wants to bankrupt a Commonwealth, and when the Governor told me the amount of revenue that was at his disposal, all I could say was that I did not see where the extra million dollars increasing the appropriation from $15,000,000 to $16,000,000, was to come from. But this is the point I am trying to make; if those who are interested in schools keep their arms folded while every other interest in the Commonwealth clamors for money, whatever State revenue there is will go off into other channels and the schools will grow in the number of children to be educated while the legislative appropriation will be at a standstill. Hasn't the time come when the growth in the number of schools, in school population, in new problems which have to be solved, must be met by larger legislative appropriations?

There is one other thing demanding attention. The schools do a very great service to the 50 per cent. of our school population who are above the average, but the question that keeps me awake at night is, What can the school do, say, for the 45 per cent. who are below the average? We are there up against a very, very serious problem, and unless we can develop our school system in the direction of vocational education, not merely in the direction of better agriculture but in the direction of better training for all the industries of the Commonwealth, our schools will not do what they ought to do for this 45 per cent. who are below the average. In philosophy the cry was "Back to Kant," but very few got back to Kant. A few years ago the cry was "Back to the farm." We now know that it is almost a hopeless task to bring the city people back to the farm. The only sensible thing to do is to take care of those who today are growing up on the farm. Show them the possibilities of the vocation of farming. Show them that men like Washington and Jefferson and Cincinnatus spent their days on the farm and were, by vocation, farmers. Instill into our boys and girls different ideals and make the farm a place quite as attractive as any city can be. If we educate from that point of view, I believe that ultimately the school will help to keep the boys on the farm. When we began the teaching of temperance physiology—fizzleology as my friend used to call it at first—everybody laughed at the blunders we were making. In one of the books we taught the boys how to set up an amateur still and manufacture the alcohol, and there were boys who tried to make alcohol and tried the effects of the stuff. (Laughter). Today we do not commit blunders of that sort in the teaching of physiology; it is no longer fizzleology, and it is bearing good fruit in the life and conduct of the pupils. The sentiment against the saloon, which is making itself felt all over the country, is largely the result of the teaching in our schools for a generation. It is my hope that when we have taught the glories and attractions and advantages of rural life for a generation we will produce the same effect that we have produced in anti-saloon agitation.

The CHAIRMAN: This address will be placed on the records. We are now ready to hear the report of the committee that was appointed yesterday.

MR. KILLAM: We have written out the following report and I will now read it:

## REPORT OF SPECIAL COMMITTEE ON ROADS

To the President and Members of the State Board of Agriculture:

Your Committee appointed, known as the Road Committee, with instructions to report at the meeting to be held on Thursday afternoon, February 29, respectifully report progress and submit the following for your consideration, limited time prohibiting our making a lengthy report at this time.

We met the officials of the State Highway Department and discussed with them the matter of improving the highways of the Commonwealth as State Highways and State-aid Highways; and also the betterment and improvement of township earth roads. We do find that indiscriminate appropriations made to various charitable, semi-charitable, educational, and other institutions in the State have so depleted the State Treasury that there are no funds available for legitimate improvement of the highways of the State; and that the system of appropriations has been an incentive to certain people in various sections throughout the State to organize institutions, in the name of charity, education, and for other reasons, concerning which institutions intimations have been made that they are used for private profit and gain; that at every session of the Legislature a new crop of such institutions come forth, until such appropriations have reached the vast amount of over $20,000,000.

Therefore, Your Committee recommends to the State Board of Agriculture that the time has arrived to call a halt, and considers that the State Board of Agriculture should get in line and work harmoniously with the State Board of Charities and other Boards interested in such appropriations to the end that they be properly made instead of indiscriminately.

We believe that many such appropriations are unconstitutional and void, and should not be made. Your Committee has also learned, in going over the matter as thoroughly as we could during the short time allotted us, that the appropriations made at the last session of the Legislature exceeded the income or revenue by $27,000,000. The highways of the Commonwealth are not given sufficient consideration and, by reason of the large amounts appropriated as stated, are deprived of funds that should be appropriated to carry on the construction and maintenance of said highways in keeping with the demands of the times and with work being done in sister states.

Your Committee finds, upon inquiry, that in order to further the work of improving the roads and highways of the Commonwealth and to enable the State Highway Department to carry out the provisions of the laws now in force, there should be appropriated a sum sufficient to allow the expenditure of at least six million dollars annually for construction, maintenance and upkeep of the township earth road.

B. F. KILLAM,
S. S. BLYHOLDER,
MATTHEW RODGERS,
P. S. FENSTERMAKER,
C. H. DE WITT,
Committee.

MR. KILLAM: That is about as far, Mr. President, as we could go into this matter, and while we had in view and have in view certain other lines, it is about as much of a report as we could make at this time, in the limited time we had to make a report.

The CHAIRMAN: Gentlemen, you have heard the report; what is the will of the convention in this matter?

SECRETARY CRITCHFIELD: Mr. Chairman, I move that the report be adopted and the Committee be continued for their report, if they shall have further report to make, at the May meeting.

Motion seconded.

MR. CREASY: There is another proposition, that, while this report is all right, there is another proposition that is up in Congress and it seems to me that this committee ought to take cognizance of that. It is known as the Shackelford Bill, in Congress, by which they intend to appropriate $25,000,000 to the roads of this nation, to be appropriated in three different classes; $15 a mile for dirt roads, $30 a mile for gravel roads and $60 a mile for macadam roads. Pennsylvania, under that bill, would receive over a million dollars. I think $1,500,000, or something like that; and these roads, these dirt roads, are to be standardized; a certain standard of work is to be put on them to make them in good shape. This bill was before Congress before. It was defeated by some influences in the Senate, but I believe that, so far as I have studied the proposition in our State Grange, that it is a movement that is in the interest of the farmers of this nation. I understand that in the State of Missouri that adopted this plant last year, through their Legislature, and they improved 12,000 miles of road in one year. Now it seems to me that is a proposition that the National Government is back of and that this State Board of Agriculture should get back of, because I think it is a step in the right direction, that it does not require an enormous outlay for official work but it is put down according to our school standard and you put the roads up to this standard and you get the money, if you don't, you will not get the money. I think it is a splendid plan that is workable at a very small expense, and I would suggest that the committee look the matter up and report later at this session.

MR. KILLAM: In regard to what Mr. Creasy says, the Committee took up that matter and took it into consideration somewhat, but the Committee did not think the time was ripe to make any report along that line, and we thought that, whatever Committee was doing this work, it would be a continuous work and that our May meeting would be a proper time for the Committee to make a more elaborate report and bring this matter in at that time, and the suggestion from Mr. Creasy is a good one, you know, it is something that the whole Department of Agriculture should keep their eye on that great appropriation that might go through in our National Government.

MR. CREASY: The only thing I wish to say in regard to my friend's remarks is this, that Congress is going to act and will act pretty soon, in my opinion, they will act before May and I think a word of approval by this body will have a good effect. I spoke to a number of Congressmen from Pennsylvania and other states, and even to some U. S. Senators, and if they know that the farmers want it, it will pass without doubt, because they are anxious to improve the roads of this country and expect to improve a million miles of road in the course of ten years; therfore I think we should act now.

A Member: A motion to amend the report to that effect would be all right as far as I am concerned.

SECRETARY CRITCHFIELD: The Committee was appointed by resolution yesterday, and the provision of the resolution was that the work of the Committee should be to devise some plan for raising money for the improvement of the roads of the State. Now, the object that Mr. Creasy has in view, I think, can be accomplished at this meeting if a resolution be prepared and handed to the Chairman of the Standing Committee. That would be one way by which we can give expression of our views to the Congress now in session as to what the farmers of Pennsylvania think.

MR. CREASY: I think that is a good suggestion, and we will try and get a resolution ready for this evening's session.

MR. KILLAM: That is outside of the work of the Committee; the whole Department of Agriculture of this State should go on record on that matter in the form of a resolution.

The CHAIRMAN: The motion before the Board is that the report of this Committee shall be received and that it be continued and report further at the May meeting.

The motion was adopted.

SECRETARY CRITCHFIELD: Mr. Chairman, it is only five minutes past four o'clock now and we have gone through with the program for this afternoon. Possibly there may be another committee to report. I think we have all appreciated the help that has come from the various departments of the State Government and we want to show to these departments as much courtesy as we can. I have come to the knowledge of the fact that it will suit the State Fire Marshal very much better to give us his address this evening than tomorrow afternoon, and I think there is ample time to hear him. If there is no objection, Mr. Chairman, I would be glad to have you call for that address now.

MR. KILLAM: There were some matters in relation to the discussion of these papers that have been read and were spoken about this forenoon that seem to have been overlooked. Any discussion by the members of any of the papers that were read or any of the subjects treated—some of them this forenoon spoke about it; perhaps that has been overlooked.

The CHAIRMAN: Shall we take up discussion, or shall we take up the address of the State Fire Marshal at this time? What is the will of the convention?

MR. FENSTERMAKER: There has been no discussion today of any topic. I had a question this morning that I wanted to ask Dr. Conard, that was cut short, and I was given to understand there would be discussion later.

SECRETARY CRITCHFIELD: I understand that this address will take only fifteen minutes and it is one of great importance. Possible the Fire Marshal may not be able to give this address unless it is given now.

The CHAIRMAN: Then I will call on the Hon. Jos. H. Baldwin, State Fire Marshal.

Mr. Chas. O. Wolfe read the paper, which is as follows:

## FIRE PREVENTION

By HON. JOS. H. BALDWIN, *State Fire Marshal.*
(Read by Mr. Chas. D. Wolfe)

MR. WOLFE: I thank you for this courtesy. I am here representing the Fire Marshal, in his absence, and I feel that this subject is as great and important as any that has been or will be discussed before your meeting.

When a physician is called to treat a patient for an ailment, he first studies the cause of the ailment and then attacks the cause. The fire waste in this country is an ailment of collossal proportions, which cannot be cured until the causes are studied and when found, vigorously attacked. Causes of fire waste are many and varied, but by the concerted action of public spirited citizens interested in the welfare of their communities, and public officials charged with the enforcement of the law, for the reduction of fire waste and saving of life and property, the causes can be ascertained and the remedy applied that will correct this expensive and damaging ailment.

The public press forms the greatest educational force in the country, and every effort should be made to enlist its assistance in disseminating information in the crusade for fire prevention. The press is already alive to the situation and beginning to note the tremendous increase in fire waste; and it should be the duty of every one interested in decreasing this fire waste to take the press into consideration and through its columns get in touch with its readers for the purpose of arousing civic pride and instilling in their hatred for all dirt, littered back yards, trash-filler vacant lots, delapidated buildings, which are a fire menace, and all other possible fire hazards. They can aid in educating children in the causes of fires and their prevention and in many ways assist in this great and worthy cause.

The fire waste is a costly proposition in more ways than one in addition to the loss of property and its attendant cost. The continuous wastefulness is adding year by year to the cost of insurance, as all insurers know too well; and there will be no reduction in this cost, but a greater increase unless the fire waste is materially lowered by active work along the lines of fire prevention. All citizens are vitally interested and should lend their aid in this work and do so most willingly as they and their families are the ones benefited, for the reason that should a fire occur on their property they not only lose that property, but may also lose some loved one whose loss will ever remind them of their carelessness and failure to keep their premises free from all fire making material

Again, should there be no loss of life and their property be fully insured, they should know that the money to pay the loss does not come from the insurance companies, but out of the pockets of their neighbors and fellow insurers who pay the premium for insurance and they must stand their share when a neighbor sustains a loss. So that the reduction in fire hazards by means of fire prevention means a reduction in the cost of insurance and further benefit to all insurers.

Firemen can be utilized to a great advantage in fire prevention and should be taught that fire prevention is quite as essential as fire fighting, and if proper instructions be given and carried out it will save their annual salaries many times over by securing the removal of hazards which might cause disastrous fires.

The fight for fire prevention is on and is nation wide. The public is becoming aroused to this useless loss caused by thoughtlessness and expensive carelessness. All that is necessary to carry on the fight successfully is a concerted action on the part of property holders, who are the ones most interested and who will profit both financially and in peace of mind for their efforts.

It is shown that the fire loss in this country amounts to about $3.00 per capita compared with the loss of about 33c per capita in Europe. This has brought most forcibly to the minds of the thinking public the fact that something is wrong and upon investigation it has been clearly shown that the fire waste throughout the country is not only unnatural, but absolutely unnecessary and has resulted in establishing in nearly every State the office of a State Fire Marshall with power to investigate the causes of fires and the remedying of conditions for the prevention of fires, this including the removal of delapidated structures and destruction of all rubbish or material that would in any way cause fire. With the power given the State Fire Marshal and the proper support of the public a great reduction in the fire waste will be effected and a long step forward taken for fire prevention.

Owing to many inadequacies in the law establishing the office of State Fire Marshal, it is at times difficult to cope with situations presented and opposition is met in endeavors to benefit the public. This should not be as the Department has no selfish purpose to serve in its actions and is endeavoring to work for the benefit of the people of the entire State and desires and welcomes every assistance. Notwithstanding the objectionable features of the law and the lack of powers it grants, the Department has been able to do much work looking towards fire prevention and the elimination of the fire bug; but much remains to be done which requires constant and hard work.

In the interest of fire prevention, this Department with but seven field men to cover 65 counties, or 44,328 square miles, has vigorously pushed the work of reducing fire waste by means of circulars, personal appeals of deputies and assistants and special efforts have been exerted towards the elimination of the incendiary. From September 21st, 1912, when the active operation of the Department began, there have been received reports of seventy-seven hundred and seven (7,707) fires (not including Philadelphia and Pittsburgh). There have been sixty-nine hundred and thirty-seven (6,937) inspections in forty-six (46) counties on complaint made of structures being in a delapidated and dangerous condition, accumulation of trash or the careless handling of combustibles or explosive material. In all cases orders were issued for the removal or remedying of conditions and these orders were followed closely to compel compliance therewith. There were also three hundred and forty-seven (347) special investigations into supposed incendiary fires in fifty-two (52) counties which resulted in forty-nine (49) convictions, including nine (9) confessions, three (3) suspects committed suicide, eight (8) suspects left the jurisdiction of the State and one (1) suspect dies in jail while awaiting trial. There were thirteen (13) acquittals. Fifteen (15) cases are in the hands of district attorneys for trial, sixty-eight (68) cases are still under investigation, and there were two hundred and two (202) cases in which there was either no evidence of incendiarism or lack of sufficient evidence to warrant prosecution.

In every state where active work has been done in fire prevention there has been a material reduction in the fire loss, and where fire prevention has been combined with improved building laws reports show that the efforts put forth have been amply repaid.

A study of the subject shows conclusively that over fifty per cent. of the fires that occur are caused by carelessness on the part of persons lacking proper teaching. This carelessness can and should be overcome by educational measures rather than by laws that are often hurriedly enacted without having been given due consideration and in many cases are totally inadequate to cope with the situation. Education should commence with the children in the schools, of which there are twenty millions in the United States and should embrace fire drills and the study of the chemistry of fires. Lessons should be simple and cover such subjects as the proper and improper use of matches, kerosene oil and oil stoves, gasoline and gasoline stoves, oil lamps, wicks and chimneys, stoves and stove pipes, heaters, fire places and grates, the proper making and keeping of fires, construction and care of chimneys, the effect of sparks on shingle roofs, prevention and remedy; care of hot ashes, cause and effect of leaking gas, its danger and prevention, the possibility of grease, oil and oily rags causing spontaneous combustion; also studies in electricity and electric wires, showing the dangers of defective wiring, and special lessons covering a sane and safe Fourth of July and danger at Christmas time by the use of flimsy decorations and lastly, lessons in fire fighting.

The field for this preliminary work is ready and should be used and it means the attaining of active allies in the near future in fire prevention. Educate the children and in most communities the parents who have probably given no thought to the subject will fall in line and an army enlisted to fight, for clean, wasteless, trashless communities will have been established and be more efficient than all the laws that can be enacted to that end. An educational campaign requires constant thought and active work and should be far reaching in effect. It must be undertaken with a determination to carry it successively into every home within the Commonwealth and endeavor to enlist every individual as an advocate for absolute prevention, a means of education which will be received with absorbing interest.

The advancement in means of educating the public in subjects in which they are interested has brought into use for that purpose moving picture exhibitions which, together with lectures, can be utilized to advantage in the fight for fire prevention. This topic is quite as important to a community as its health, as it means above all cleanliness, carefulness, the preservation of property and saving of life. The exact conditions that exist in a community can be shown as compared with location where the work for fire prevention has progressed. In the exhibition of pictures showing conflagrations care should be exercised that no subject be displayed that will appeal to the weak or evil minded and no exhibitions should ever be permitted showing the incendiary about to set off any device to cause fire in a building, nor should any display be made of any of the various devices known or used by the fire bug to carry on his nefarious work. Such pictures appeal to children and the unscrupulous, and attempts might be made to carry out in reality the ideas depicted by the pictures.

Chambers of Commerce, Boards of Trade, Village Improvement Associations and other associations should be invited to participate and aid in this great work which means so much.

The CHAIRMAN: This report will also be filed.

MR. YOUNG: The Executive Committee is ready to report.

The CHAIRMAN: Well, you see there is a time schedule for that; this evening is the time, but I suppose there would be no objection to receiving the report now, would there, Mr. Secretary?

SECRETARY CRITCHFIELD: I can conceive a reason why it should be received now; they name the Standing Committees, and one of those committees is the Committee on Resolutions and there are several resolutions now waiting to be handed to the Committee on Resolutions.

The CHAIRMAN: We will hear the report now.

MR. YOUNG: I will proceed to read the report. It consists mainly of naming committees, and is as follows:

## COMMITTEES AND SPECIALISTS OF THE STATE BOARD OF AGRICULTURE

### ADVISORY COMMITTEE

| | |
|---|---|
| Dr. W. Frank Beck, | Altoona. |
| Mrs. Jean Kane Foulke, | West Chester. |
| J. Newton Glover, | Vicksburg. |

### COMMITTEE ON RESOLUTIONS

| | |
|---|---|
| John Schoener, | New Ringgold. |
| G. A. Benson, | Tunkhannock. |
| Joel A. Herr, | Millhall. |
| F. S Brong, | Saylorsburg. |
| B. Frank Wambold, | Sellersville. |

### COMMITTEE ON LEGISLATION

| | |
|---|---|
| S. S. Blyholder, | Kelly Station. |
| M. M. Naginey, | Milroy. |
| Hon. H. C. Snavely, | Cleona. |
| Hon. H G McGowan, | Geiger's Mills. |
| Hon. Robert W. Lohr, | Boswell. |

## CONSULTING SPECIALISTS

| | | |
|---|---|---|
| Botanist, | Prof. F. D. Kern, | State College. |
| Pomologist, | Chester J. Tyson, | Floradale. |
| Chemist, | Dr. William Frear, | State College. |
| Vet. Surgeon, | Dr. C. J. Marshall, | Harrisburg. |
| Sanitarian, | Hon. S. G. Dixon, | Harrisburg. |
| Microscopist and Hygienist, | Prof. J. W. Kellogg, | Harrisburg. |
| Entomologist, | J. A. Herr, | Lancaster. |
| Ornithologist, | Dr. Joseph Kalbfus, | Harrisburg. |
| Meteorologist, | Prof. W. G. Owens, | Lewisburg. |
| Mineralogist, | Dr. Isaac A. Harvey, | Lock Haven. |
| Apiarist, | H. C. Klinger, | Liverpool. |
| Economic Geologist, | Baird Halberstadt, | Pottsville. |
| Agricultural Geologist, | W. H. Stout, | Pinegrove. |
| Forests and Forestry, | Miss Mira L. Dock, | Fayettsville, R. D. |
| Feeding Stuffs, | G. G. Hutchison, | Warrior's Mark. |

The Committee would recommend that a Specialist, to be known as the Specialist on "Soils and Crops," be made and that Prof. Franklin Menges, York, Pa., be made the Specialist for this year.

## STANDING COMMITTEES

### CEREALS AND CEREAL CROPS

J. Newton Glover, Vicksburg.

### ROADS AND ROAD LAWS

P. S. Fenstermaker, Allentown.

### FRUIT AND FRUIT CULTURE

W. F. Biddle, Everett.

### DAIRY AND DAIRY PRODUCTS

Dr. M. E. Conard, Westgrove.

### FERTILIZERS

John Shoener, New Ringgold.

### WOOL AND TEXTILE FIBERS

James M. Paxton, Houston.

### LIVESTOCK

W. C. Black, Mercer.

### POULTRY

W. Theo. Wittman, Allentown.

Executive Committee,
A. P. Young.
Jean Kane Foulke.
S. S. Blyholder.
H. G. McGowan.
John Schoener.
W. F. Holtzer.
J. Newton Glover.
G. F. Barnes.
M. M. Naginey.

MR. ESCHBACH: I move that we accept the report of this committee as a whole.

The motion was seconded by Mr. Cowan and adopted.

MR. McGOWAN: I just noticed that my name has been mentioned as on the Committee on Legislation. I was just thinking that I believe it is possible to accomplish more along legislative lines than we have in the past year. My attention just called to this fact by a gentleman who came to me a few hours ago, who said that when our committee met he would like to know it, as he had some matters that he wanted us to consider. Now it has been said that this committee is not to create legislation, but to consider such matters as are brought before it. We all recognize the very great importance of the Committee on Legislation, and I trust that we will have the most hearty and thoughtful co-operation by every member of this Board so, that in the coming year, we may be able to accomplish more along legislative lines for the benefit of the farmers of our great State.

The CHAIRMAN: Is there anything further before the convention this evening? Mr. Fenstermaker, we will allow you time to put that question.

MR. FENSTERMAKER: I would like to ask Dr. Conard—he referred to the Pennsylvania Railroad reaching out in all directions to get milk and Brooklyn dealers being anxious to have it. What are they paying for milk?

DR. CONARD: A little more than the Philadelphia dealers can pay. I don't know what they are paying just now; the New York market pays 9c a quart for the regulation retail milk; Philadelphia pays 8c; it puts the New York people into the market as very wicked competitors.

MR. FENSTERMAKER: I mean what do the farmers get for their milk?

DR. CONARD: That's the point I don't know; I don't know what they are paying the farmer.

MR. GLOVER: The Diamond Dairy Company, of Erie, has a plant at Vicksburg, and they pay $1.90; the average for 1913 was $1.64 and a fraction, delivered at the creamery.

MR. HUTCHISON: At Altoona, the Erie people are paying $2.00 a hundred pounds, coming around and soliciting it and it is no trouble to make contracts at $2.00 a hundred for the winter months. I cannot tell what they will pay in the summer.

MR. FENSTERMAKER: How much a quart will that be? What is the size of the cans?

DR. CONARD: One hundred pound cans; 46 quarts in a can.

MR. FENSTERMAKER: That's 4c a quart then.

DR. CONARD: It runs nearer three.

**MR. FENSTERMAKER:** Is that a profitable business, to produce milk for 3c a quart?

**DR. CONARD:** That depends on your cows. It is not a profitable business if a cow does not give more than 4,000 pounds of milk a year, or a little over 2,000 quarts; that would be $60, at 3c a quart. It will cost you $60 to $75 a year to feed a cow, so there is nothing in it at that, if she gives 4,000 pounds; but if she gives 6,000 pounds, as a great many do, and a great many cows give more, you see that puts it in another class, that puts it at $90, at 3c a quart, and then you have a little margin.

**MR. FENSTERMAKER:** Exactly. At the Experiment Station, I have not seen any lower figure than 5c a quart as the cost of production, and some go as high as six, figuring everything in, including labor. Now can the farmer afford to produce milk at 3c a quart when, with an average herd like that at the Experiment Station, it costs them 6c a quart to produce it?

**SECRETARY CRITCHFIELD:** The milk produced on my farm is selling at 8c a quart, and the farmer is purchasing milk from his neighbor at 6c a quart that he puts in with his milk.

**DR. CONARD:** I will tell you of an extreme case that illustrates the difference between a good cow and a poor one. The cow had recently finished a manual test of 23,000 pounds of milk in a year, or something over 11,000 quarts. The milk, at 5c a quart—it was retailed at more than that, but it could be retailed at 5c most anywhere, or much of it could be wholesaled at that, brought in—I can't give you the exact figures, but I can give you the difference—it brought in enough money so that when her feed, which cost $184 in the year, was deducted, it left $364 for milk over and above the cost of feeding, almost a dollar a day. Now I say it is an extreme case, but it shows the difference between a good cow and a bad one. That cow will make almost a dollar a day and yet it cost $184 to feed her. If we have our cows bred up and selected, bred and cared for properly so that they will give us a large flow of milk, 6,000 or 7,000 pounds in a year, we can make a profitable business of it; but the average cow that gives 140 pounds of butter fat and about 4,000 pounds of milk in a year, is not a paying proposition.

**MR. FENSTERMAKER:** The reason I asked the question was that somebody remarked that anybody who tries to make a dairy pay will become crazy.

**A Member:** What would such a cow be valued at?

**DR. CONARD:** I don't know; this was very high bred, imported cow. I know another cow that made a record in five consecutive years of 62,000 pounds of milk, a little over 12,000 pounds of milk a year. They refused $2,500 for that cow.

**A Member:** Was the cost of the animal considered when you computed the profit?

**DR. CONARD:** No, nothing at all but the milk and the feed. I just brought it up to show what it was possible for a cow to do.

MR. STOUT: I inquired what was the price received for this cattle and was told $7,000 for a cow and $16,000 for a bull.

MR. WELD: Mr. Chairman and Gentlemen: I am interested in cows, too, and I believe that the right kind of cow, such as Dr. Conard has been speaking about, can be made to pay in Pennsylvania; in fact, I know they can and I know that the average man who heeps cows does not appreciate what it costs per year to keep a cow and he falls down on the dairy business from that very fact, that he does not take into consideration that he is paying out $55 to $70 a year for food alone for that cow, and if he hasn't got a cow that will return him more than that many dollars worth of material, he is playing a losing game. If he has bred and selected his cows with a view to making them efficient users of feed, he can get back anywhere from $1.50 to $2.00 for every dollar he puts into the cow for food alone, and that is pretty good. My own dairy this last year paid me $1.68 for every dollar, pasture included, that I put into the manger of those cows, in the past twelve months; every bit of feed measured as accurately as we could measure it and computed at its market value, and it cost me $70 a piece to feed them, and yet, with that cost, they returned me $1.68 profit for the part of their product which I sold alone, namely the butter fat, and above that product I had the skimmed milk and the offspring of the cow and the manure to offset the investment and labor, but taking the actual cost of the food and crediting it with the part of the product I sold to my customers, those cows paid me $1.68 for every dollar of cost I put into them.

MR. BLYHOLDER: I would like to ask the brother how much he got for his milk?

MR. WELD: I made the milk into butter and sold the butter at the highest New York quotations for specials.

SECRETARY CRITCHFIELD: I have just one little cow story I want to tell. One of my neighbors, formerly in the hardware business, left the business. He stayed in the same town; he retired, however, from the hardware business and kept one good cow and he told me that the year preceding—this was the year 1912—his cow had paid him, I think it was, $104; it was over $100., I think it was $104. He sold the milk, he didn't make any butter he bought butter for family use, he sold his milk using only enough for table purposes in his own family and made $104.; if it was $104. It was over $100 and I think it was $104, over and above all that it cost him to feed that cow. He bought everything, his pasture, his hay, everything that he fed her, and he is a man that will be willing to testify to that at any time.

MR. FENSTERMAKER: This reminds me of a poultry story I read not long ago. Some lady was very successful in raising young chickens and bragged about it to her neighbors and they asked her, "Did you figure the labor?" "No," she replied, "if you figure the labor, it won't pay." He's a good dairyman—doesn't figure his own labor; that is one of the items that we farmers all forget, we take it for granted that we are working for nothing. No other business under the sun would attain success under those conditions; you must figure the labor, no matter who does it.

MR. HUTCHISON: I want to bring you a case where a man did nothing but farm on fifty acres since the war. Farmers' Institutes came into our community some years ago, under Secretary Edge. This man got a fashion of keeping eight or ten cows. This man has done nothing but farm; he has as nice a property as there is in our valley. He has a nice house, nicely painted; he has a nice barn painted red; he has educated his children fairly well; he has clothed them well; he has raised five children; he has contributed to the good and welfare of the community; he is a member of the church, he contributed and he did it well; he drives to church, while he is farming, with a nice team, and he has lived as a man. His son grew up with him and the father retired and the son took the farm of fifty acres and followed the same process, never speculated a day in his life; had about ten cows, made butter that he sold in Tyrone market for thirty-five cents. He had a piece of land that is a garden, very productive. He bought thirty some acres to add to that farm; he has fixed that up; it's a place which, if you drive along the road, you will stop and look at, and he never engaged in anything but the eight or ten cows, making good butter and selling it at a good fair price.

Now, he didn't get that money from out of the clouds, he didn't dig it up out of the earth, he made it legitimately farming in that line. That is only one case of thousands that could be mentioned all over this Commonwealth; where a man will put brains and labor and patience into his work and seek a market, he will increase his wealth by keeping cows.

DR. CONARD: I could cite you several cases similar to that. I think of two men in my own neighborhood who keep, one of them about thirty cows, maybe forty part of the time; the other one, less. They had a market for cream. They would sell perhaps twenty-two per cent. cream for eighten cents a quart. They had the skim milk left at home. Those men, for that cream alone, realized, one of them $110. and some cents per cow; the other one $115., I think, and some cents, per cow, per year. That doesn't count anything for skim milk; it doesn't count anything at all for the calves, and the work is comparatively little, the freight is light, because there is only the cream to ship. They run it into the market quite easy, it is really about the easiest way of dairying that I know of. That was about four or five years ago when feed had not reached the price it has to-day. I am sure that, compared to present prices, those cows did not cost over $60. a head to feed them, probably less than that, at that time, leaving a good margin of $50 profit on every cow, taking them as a herd. Of course one cow, if she happens to be a very good one and does not have any drone to live off of her, will naturally be better, but where you take the herd through, good and bad, and these were well selected cows, each one tested individually, that margin was pretty good, and those two men both sold their farms—came to an age when they did not want to follow the work any longer—and both made their farms out of that kind of business and are living in Westgrove, one of them, and the other in Applegrove, and can go where they please, at least one of them can, the other can't because he is a cripple.

The CHAIRMAN: I suppose we had better adjourn this discussion as the hour is getting late, and it has been suggested to me that I had better read the names of the Committee on Resolutions and then any one who has any resolutions to offer can hand them to some member of the Committee or have them presented in the session to-morrow.

(After the names of the members of the Committee on Resolutions had been read, the meeting adjourned.)

January 30, 1914, 7:30 P. M.

Vice President Wilson in the Chair.

The CHAIRMAN: The meeting will come to order.

MR. KILLAM: I have a resolution that the Road Committee wish to present to the State Board of Agriculture at this time;

*Whereas,* Pennsylvania, at the last election clearly demonstrated that she believes in a system of business roads leading from the farm to the market town, railroad station, school and church on the "pay-as-you-go" plan, and

*Whereas,* A bill now in Congress known as the Shackelford Road Measure, provides aid for the various states for the improvement of roads by granting $60. per mile for macadam, $30. per mile for gravel and $15. per mile for earth roads, yielding annually over $1,000,000 as Pennsylvania's share, therefore,

*Resolved,* That we urge that each individual Congressman and Senator representing the Keystone State, support by their vote, the passage of the Shackelford Road Bill.

*Resolved.* further, That we endorse the action of Congressman Dersham and others in the loyal support they are giving the measure in their Committee on Public Roads.

This resolution by the Road Committee has been drawn up and presented to this meeting for such action as you may deem proper.

On motion of Mr. Hutchison, the foregoing resolution was adopted.

MR. HUTCHISON: I move that the Secretary be requested to send a copy of this Resolution to each member of Congress from Pennsylvania and also to our Senators.

The motion was seconded and adopted.

The CHAIRMAN: First on the program this evening, is the report of Mr. George G. Hutchison, Specialist on Feeding Stuffs.

MR. HUTCHISON: My friends I am pleased to be before you to-night. I am glad to see so many familiar faces here, so many persons who are interested in the work of the farm and the home and of the State. It has been a great treat to us, while we have been here listening to these different addresses. Why they should put me on this subject this evening, I don't know; you'll have to blame the Committee. I hope I may interest you a little in this great subject that is before the people of Pennsylvania to-day. We are considering economic questions, questions of feeding our people, questions of producing cheaper foods, and the one that I have the honor to speak for a little while on, is one that lies very close to the production of foods, such as milk, butter, beef and all manner of foods that are grown upon the farm. The day was when the farmer was able to produce his own feed. The question was asked this evening by our janitor. When we worked for Mr. Young, a former member of this Board, he stated that Mr. Young grew all the feed on these rich farms down here to feed his domestic animals. Agriculture has greatly changed since Mr. Young conducted those farms.

Mr. Hutchison then presented the following report:

## REPORT OF SPECIALIST ON FEEDING STUFFS

By GEO. G. HUTCHISON, *Warrior's Mark, Pa.*

Another year has come and gone and we are before you once more to give an account of our stewardship. To some it must seem strange that there appears upon your program a report of a specialist on feeding stuffs. This title we believe would be more fitting to some College Professor; but after years of research and study on this matter, we come before you to-day hoping to bring something that may create a greater interest among you as representatives of the farmers of Pennsylvania. The question is so large and the different elements that enter into it, so great that it seems almost an impossibility to take up this subject and properly talk upon it in the short time that is allotted to me on this program; but I will try and call your attention to some of the most important phases of this great question.

The question of feeding the domestic animals is one of great importance. The day was when you farmers took your corn, oats, rye and barley to the mill in your neighborhod and had it ground into meal to feed your animals. A great many of you fed it whole. In your younger days, bran and middlings were discarded and no feeding value was attached thereto. It has only been in the latter days that science has told us the feding value or the composition of these different articles. To-day articles of feed are bought and sold on their feeding value. Little did the miller know what bran had in it, sixteen per cent. of protein and five per cent. of fat, and that it was a very valuable feed. The same is true of all the by-products that are on the market to-day. Some of these by-products run high in feeding value while lower grade by-products are mixed with the higher and are placed on the markets. The object of having legislation on this subject is to regulate the sale of these by-products feeds. The day was when we had to condemn them and point out the fraud and deception that was being practiced upon our people in the sale of these by-product feeds, but by diligent work, our law is being observed, and there never was a day that the farmer could purchase feeds with as much security and as full money value as he can today in Pennsylvania.

One of the great checks and good features of our law that I wish to call your attention to, is, that the Secretary of Agriculture, through his representatives, can call upon the firms who manufacture in his own state and ship in from outside the state, to register their feeds, giving the name of the feed or brand name, under which they intend to sell it, the analysis for protein, fat and fibre and the composition. During the last year there was filed in the laboratory office of the Department of Agriculture, the analysis and compositions of 2,000 different kinds of feeds that come upon the markets of Pennsylvania. These statements are certified to by a member of the firm, or an officer of the firm, or individual, that are manufacturing the feed. This is one of the best checks that we have on what is coming on our markets. These blanks are sent out to all firms, and on the back of the blank is a portion of the law and this explains to the mixer or compounder of these feeds, what kind of feeds can be sold in Pennsylvania without violating the law.

This has another beneficial effect. If we find on the markets any feeds that do not come up to the certification, and prosecution is ordered, we can take their certificate as a matter of evidence into court and show by that certificate what they promised to do, and by our analysis, what they failed to do.

The Feeding Stuffs law of Pennsylvania is being quoted and copied after in nearly all the states of the Union. There are a few states that have a clause in their law which compels the manufacturer of feeds to pay a license on each ton of feed sold. Our State holds that this is not the proper way to raise the money for the enforcement of this law, as that tonnage tax gives the manufacturer, or sales agent of the feed, a chance to add on, not only the amount of the license fee to each ton, but gives him a chance to add on a larger per cent. claiming that they have to pay a tax to sell the feeds in the Commonwealth. But the Legislature, in its wisdom, has given us a fair appropriation for the enforcement of the law and we believe that this is a better way as it divided the burden on all the tax payers. One of the most difficult matters that we have had to regulate in the last year, is the control of the cotton seed meals that come upon our markets. The majority of the cotton seed meals are guaranteed forty-one per cent. of crude protein, but we find quite a variation, running down to thirty-eight per cent. protein, or a variation of three per cent., some running as low as thirty-five per cent.

It was our privilege to attend the National Feed Control Convention at Washington last November, and one of the items that was on the program was the manufacture and sale of cotton seed meals. This subject was discussed by the manufacturers from the Southern states where the cotton seed is grown and the meal secured. You understand that the cotton seed is pressed to remove the cotton oil and that the cotton seed meal is the residue or by-product of the cotton seed berry, and should contain, as referred to above, nearly 41% of protein and 8% of fat, and not over 9% of crude fibre. In Texas there is a cotton seed meal that will run over 50% protein. This matter was thoroughly discussed by Dr. C. G. Fraps, State Chemist, College Station of Texas, and he gave the analysis of 266 samples of cotton seed meals which run on an average of 47-65% of protein and 6.50% of fibre. He claims that the mixers of cotton seed meal could take the cotton seed meal of Texas and add 14% of hulls and the same would run 41%, the same as the meal sold from the Southern states. His contention is that pure meal should contain a very small percentage of cotton seed hulls and that the reason that the north gets such a low grade of cotton seed meal is, that there is either cotton seed hulls added to the meal or a percentage is allowed to remain in the meal. I would say to those who are interested in the purchase of cotton seed meal, to buy it on its protein analysis, which should not be less than 41%. Its analysis for fat should not be less than 6% and its analysis for fibre should not exceed 9%. This is as good a guide as I can give you or that any chemist or chemists who have made a study of the subject.

Another great fraud in the sale of cotton seed meal, is the poor sacks or bags in which it is put up, and the great variation in the number of pounds in said sacks. I called the attention of the shippers from the South to this subject, and a number of them agreed that they were going to use good, strong sacks and guarantee 100 pounds in the same. If the purchasers of cotton seed meal would give some attention to this matter, they might be saved quite a large sum of money in the purchase of their meals. I have known as high as two tons of waste and shortage to be in a car lot of meal coming into Pennsylvania.

Another question that is before the National Department of Agriculture, at Washington, and also before the State Departments of Agriculture throughout the United States, is in regard to wheat bran. The understanding of the purchaser of wheat bran is that he is receiving the outer coating or covering of the wheat berry. This is true of the bran manufactured from pure wheat. You know in the cleaning of wheat, especially in large mills, where they manufacture the high grade flour, they scour the wheat and remove all foreign materials, such as wheat seeds, sand, small and imperfect grains of wheat and other impurities that might be mixed with the wheat. This was sold to feed compounders or mixers and the millers received a very small sum for the same.

The millers have conceived the idea that they should make some money out of this as well as the men to whom they were selling it to, hence they are grinding and running this in their wheat bran and calling it "Hill Run." This is a very misleading statement to those who do not understand it, and at the present time my contention is, that manufacturers of pure wheat bran are making a mistake and I have so stated to their National Secretary: Kansas has been following this rule for several years, but the wheat from Kansas contains very little foreign matter. The wheat of the Dakotas and the Northwest contain a very much larger percentage of foreign substances. I would be very sorry if our wheat bran that comes upon our markets should be depreciated. The sacks on which I have noticed their analysis were a guarantee of 14% of protein. This would indicate a fair wheat bran. The molasses feeds that have been coming into our State have shown a great improvement. They are finely ground, their guarantees of protein, fat and fibre are maintained, some few of them running a few percent higher in fibre than we would like to see, but there has been a great demand for these feeds and the public are buying largely of the same. Competition is regulating the price and keeping it, we believe, near its real feeding value.

We have no startling things to bring to you, as we did have some years ago, through the vigilance and work of our Bureau and the close touch that we keep with the manufacturers, our prosecutions have not been so numerous. Yet we find, now and then, some one who is anxious to make money, who has not had experience, who will place upon the markets a low grade feed, or one improperly labeled. As our report will show, we have taken over 1300 samples of feeds in the last year in 53 of the 67 counties of the Commonwealth. Our agents have visited a large number of towns and conversed with feed dealers, gave them instruction in regard to the law and other matters of importance. We have a report giving the number of samples taken in each county, the towns visited and giving a detail of the work, which I will not read, but which will appear in the Annual Report. During the year 1913, samples were taken in 53 counties of the State. The total number of towns visited in 1913, were 384. Samples of feed were not taken in all of the towns visited, as many duplicate samples of the same brands of feed found had already been taken in other towns. The total number of samples of feed taken in 1913 were 1300, distributed in the following named counties: Montgomery, 65; Crawford, 20; Forest, 9; Lawrence, 10; Mifflin, 13; Juniata, 4; Bucks, 9; Butler, 32; Beaver, 19; Lebanon, 36; Dauphin, 34; York, 37; Cameron, 8; Potter, 8; Perry, 4; Centre, 22; Armstrong, 22; Fayette, 23; Union, 23; Cumberland, 29; Franklin, 19; Lycoming, 25; Northumberland, 30; Montour, 12; Columbia, 12; Snyder, 12; Erie, 34; Tioga, 42; Sullivan, 2; Luzerne, 57; Bedford, 17; Cambria, 38; Somerset, 28; Mercer, 30; Huntingdon, 7; Allegheny, 27; McKean, 28; Blair, 29; Berks, 13; Elk, 23; Jefferson, 23; Clearfield, 24; Westmoreland, 67; Lehigh, 13; Bradford, 32; Venango, 19; Indiana, 19; Clinton, 14; Washington, 38; Delaware, 10; Philadelphia, 8; Lancaster, 61; Chester, 62.

In the following counties, towns were visited during the year:

*Lancaster County:*

Lancaster, Manheim, Mechanicsville, Lititz, Elizabethtown, Mt. Joy, New Holland, Bareville, Quarryville, Eldora, Fulton House, New Providence, Kinzer, Christiana, Columbia, Florin and Rheems.

*Chester County:*

Glen Moore, Coatesville, Parkesburg, Downingtown, West Chester, Kennett Square, Malvern, Atglen, Avondale, Phoenixville, and Pocopson.

*Delaware County:*

Chester, Darby, Glenolden and Media.

*Philadelphia County:*
Philadelphia.

*Clinton County:*
Lock Haven, Mill Hall, Flemington and Renovo.

*Washington County:*
Charleroi, Donora, West Brownsville, Washington, Speers, Monongahela, McDonald, East Washington, Houston and Canonsburg.

*Venango County:*
Oil City, Emlenton, Franklin, Rouseville, Utica and Siverly.

*Indiana County:*
Blairsville, Saltsburg, Indiana, Homer City, Creekside, Blacklick and Clymer.

*Westmoreland County:*
Latrobe, Greensburg, Mt. Pleasant, Avonmore, Bolivar, Irwin, Derry, Jeannette, Manor, Monessen, New Florence, New Kensington, North Bellevernon, New Salem, Scottdale, Parnassus, Trafford, Vandergrift, Vandergrift Heights and Youngwood.

*Lehigh County:*
Bethlehem, South Bethlehem, Allentown, Slatington, Macungie, Emaus and Catasauqua.

*Bradford County:*
Canton, Alba, Athens, Wyalusing, Towanda, South Waverly, Sayre, New Albany, Monroe, and Troy.

*Elk County:*
Ridgway, St. Marys and Johnsonburg.

*Jefferson County:*
Brockwayville, Big Run, Brookville, Falls Creek, Punxsutawney, Reynoldsville, Sykesville and Summerville.

*Clearfield County:*
Du Bois, Wallaceton, Ramey, Osceola, Mahaffey, Routsdale, Curwensville, Brisbin, Morisdale, Munson and Clearfield.

*McKean County:*
Bradford, Smethport, Eldred, Port Allegany, Mount Jewett and Kane.

*Blair County:*
Tyrone, Juniata, Martinsburg, Altoona, Roaring Spring, Hollidaysburg, Gaysport, Bellwood and Curryville.

*Berks County:*
Birdsboro, Gibraltar, Reading, Kutztown, Womelsdorf, Topton, Mount Penn, Hamburg and Fleetwood.

*Huntingdon County:*
Huntingdon, Petersburg, Mt. Union, Mapleton and Orbisonia.

*Mercer County:*
Sharon, Farrell, Greenville, Grove City, Jamestown, Mercer, West Middlesex, Wheatland and Sharpsville.

*Allegheny County:*
Braddock, Aspinwall, Brackenridge, Hays, Glassport, Elizabeth, Pittsburgh, East Pittsburgh, McKeesport, Duquesne, Carnegie, Bridgeville, Pitcairn, Homestead, Rankin, Sharpsburg, Tarentum, Turtle Creek, Verona, Walls, Wilkinsburg and Wilmerding.

*Bedford County:*
New Enterprise, Saxton, Everett, Bedford, Hopewell, and Hyndman.

*Cambria County:*
Conemaugh, Johnstown, South Fork, Barnesboro, Carrolltown, Cresson, Ebensburg, Gallitzin, Lilly, Portage, Hastings, and Patton.

*Somerset County:*
Windber, Berlin, Garrett, Hooversville, Rockwood, Salisbury, Somerset and Stoystown.

*Tioga County:*
Wellsboro, Westfield, Tioga, Osceola, Nelson, Mansfield, Lawrenceville, Knoxville, Cowanesque and Elkland.

*Luzerne County:*
Wilkes-Barre, Avoca, Dorrance, Hazleton, Kingston, Luzerne, Miner's Mills, Nanticoke, Pittston, Plymouth, West Hazleton, West Pittston and Wyoming.

*Columbia County:*
Catawissa, Berwick, Centralia, Bloomsburg, and West Berwick.

*Snyder County:*
Selinsgrove, Swineford and Middleburg.

*Erie County:*
Erie, Albion, Corry, Waterford, Girard, Belle Valley, Union City.

*Lycoming County:*
Williamsport, Muncy, South Williamsport, Newberry, Montoursville, Montgomery, Jersey Shore, Hughesville and Duboistown.

*Northumberland County:*
Sunbury, Milton, Mount Carmel, Northumberland, Shamokin and Watsontown.

*Montour County:*
Danville.

*Union County:*
Mifflinburg and Lewisburg.

*Cumberland County:*
Mechanicsburg, Wormleysburg, Shiremanstown, Shippensburg, Newville, Mount Holly Springs, Lemoyne and Carlisle.

*Franklin County:*
Shippensburg, Chambersburg, Greencastle, Mercersburg, and Waynesboro.

*Centre County:*
Philipsburg, Bellefonte, Center Hall, Howard and Unionville.

*Armstrong County:*
Apollo, Vandergrift, Leechburg, Kittanning, Ford City, Freeport, Manorville and Parker's Landing.

*Fayette County:*
Uniontown, Bellevernon, Brownsville, Connellsville, Dunbar, Everson, Fairchance, Masontown, South Brownsville and New Salem.

*Cameron County:*
Emporium and Driftwood.

*Potter County:*
Coudersport, Galeton and Shinglehouse.

*Perry County:*
Newport, Marysville, Duncannon, Bloomfield and Millerstown.

*Dauphin County:*
Hummelstown, Harrisburg, Highspire, Middletown, Penbrook, and Steelton.

*York County:*
York, Hanover, York Haven, Wrightsville, West York, Springgrove, Red Lion, Glen Rock, Dillsburg, Dallastown and New Freedom.

*Bucks County:*
Richlandtown, Bristol, Chalfont, Doylestown, Perkasie, Quakertown, Sellersville, and New Hope.

*Butler County:*
Butler, Mars, Harmony, Zelienople, Evans City and Slippery Rock,

*Beaver County:*
Beaver Falls, New Brighton, Monaca, Rochester, Freedom, Bridgewater, Beaver and Ambridge.

*Lawrence County:*
New Castle, Wampum, Volant and Ellwood City.

*Mifflin County:*
McVeytown, Lewistown, Newton Hamilton and Reedsville.

*Juniata County:*
Mifflin and Port Royal.

*Montgomery County:*
Pottstown, Ambler, Bridgeport, Conshohocken, Hatboro, Jenkintown, Lansdale, Norristown, North Wales, Royersford, Souderton, Colmar and West Point.

*Crawford County:*
Meadville, Titusville, Saegerstown, Linesville, Hydetown, Conneautville, Conneaut Lake, Cochranton and Cambridge Springs.

*Forest County:*
Tionesta.

Many inquiries are received in regard to the character of buckwheat offals. The two principal buckwheat products which we are called upon to examine from time to time, are buckwheat middlings and buckwheat feed. The analysis of the middlings has been found to be as high as 32% of crude protein, with 7% of crude fat and 4% of crude fibre. Some samples which were classed as buckwheat middlings, ran as low as 19% of protein. The buckwheat feed is simply a mixture of middlings and hulls, and the dividing line between these two products is sometimes difficult to be determined. Buckwheat feed will analyze about 12 to 14% of crude protein, with a maximum amount of crude fibre of about 20 to 25%. Buckwheat offals, which contain more than 19% of crude protein, and with less than 12% of crude fibre, are usually classed as buckwheat middlings. Those offals which run less in protein and exceed 12% in fibre are classed as buckwheat feeds. For your information I will give you the definitions, as adopted by the Association of Feed Control Officials of the

United States, at their annual meeting at Washington, D. C. The definitions may be of some value to you, if you will study them and they answer a great many questions that come up in regard to concentrated feeds.

## DEFINITIONS

The following feeding stuffs definitions were adopted by the Association of Feed Control Officials of the United States. Many of these definitions were included in our former report; and inasmuch as new definitions were adopted at the meeting, held November 18, and 19, 1912, the total list of definitions is herewith presented.

*Alfalfa Meal* is the entire alfalfa hay ground, and does not contain an admixture of ground alfalfa straw or other foreign materials.

*Blood Meal* is ground dried blood.

*Brewers' Dried Grains* are the properly dried residue from cereals obtained in the manufacture of beer.

*Buckwheat Shorts*, or *Buckwheat Middlings*, are that portion of the buckwheat grain immediately inside of the hull after separation from the flour.

*Choice Cottonseed Meal* must be finely ground, and not necessarily bolted, perfectly sound and sweet in odor, yellow, free from excess of lint, and must contain at least 41 per cent. of protein.

*Chop* is a ground or chop feed composed of one or more different cereals or by-products thereof. If it bears a name descriptive of the kind of cereals, it must be made exclusively of the entire grains of those cereals.

*Clipped Oat Refuse* (term oat clippings not recognized), is the resultant by-product obtained in the manufacture of clipped oats. It may contain light, chaffy material broken from the ends of the hulls, empty hulls, light immature oats and dust. It must not contain an excessive amount of oat hulls.

*Corn Bran* is the outer coating of the corn kernel.

*Corn Feed Meal* is the sifting obtained in the manufacture of cracked corn and table meal from the whole grain.

*Cornstarch By-Product*, with corn bran, is that portion of commercial shelled corn that remains after the separation of the larger part of the starch, and the germ by the processes employed in the manufacture of corn-starch and glucose. It may or may not contain corn solubles.

*Cornstarch By-Product,* without corn bran, is that part of commercial shelled corn that remains after the separation of the larger part of the starch, the germ and the bran by the processes employed in the manufacture of cornstarch and glucose. It may or may not contain corn solubles.

*Cottonseed Feed* is a mixture of cottonseed meal and cottonseed hulls, containing less than 36 per cent. of protein.

*Cottonseed Meal* is a product of the cottonseed only, composed principally of the kernel with such portion of the hull as is necessary in the manufacture of oil; provided, that nothing shall be recognized as cottonseed meal that does not conform to the foregoing definition and that does not contain at least 36 per cent. of protein.

*Cracklings* are the residue after partially extracting the fats and oils from the animal tissue. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

*Digestive Tankage* is the residue from animal tissue exclusive of hoof and horn especially prepared for feeding purposes by tanking under live steam, drying under high heat, and suitable grinding. If it contains any considerable amount of bone it must be designated Digester Meat and Bone Tankage.

*Distillers' Dried Grains* are the dried residue from cereals obtained in the manufacture of alcohol and distilled liquors. The product shall bear the designation indicating the cereal predominating.

*Flax Plant By-Product* is that portion of the flax plant remaining after the separation of the seed, the baste fiber and a portion of the shives, and consists of flax shives, flax pods, broken and immature flax seeds and the corticle tissue of the stem.

*Good Cottonseed Meal* must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, and must contain at least 36 per cent. of protein.

*Grits* are the hard, flinty portions of Indian corn without hulls and germ.

*Hominy Meal, Hominy Feed,* or *Hominy Crop* is a mixture of the bran coating, the germ and a part of the starchy portion of the corn kernel obtained in the manufacture of hominy grits for human consumption.

*Malt Sprouts* are the sprouts of the barley grain. If the sprouts are derived from any other malted cereal, the source must be designated.

*Meal* is the clean, sound, ground product of the entire grain, cereal or seed which it purports to represent; Provided, that the following meals, qualified by their descriptive names, are to be known as viz: *Corn Germ Meal* is a product of the manufacture of starch, glucose and other corn products and is the germ layer from which a part of the corn oil has been extracted. *Linseed Meal* is the ground residue after extraction of part of the oil from ground flax seed.

*Meat Scrap and Meat Meal* are the ground residue from animal tissue exclusive of hoof and bone. If they contain any considerable amount of bone, they must be designated Meat and Bone Scrap, or Meat and Bone Meal. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

*Oat Groats* are the kernels of the oat berry with the hulls removed.

*Oat Hulls* are the outer chaffy coverings of the oat grain.

*Oat Middlings* are the floury portion of the oat groat obtained in the milling of rolled oats.

*Oat Shorts* are the covering of the oat grain lying immediately inside the hull, being a fuzzy material carrying with it considerable portions of the fine floury part of the groat obtained in the milling of rolled oats.

*Prime Cottonseed Meal* must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, yellow, not brown or reddish, free from excess of lint, and must contain at least 38.6 per cent. protein.

*Red Dog* is a low grade wheat flour containing the finer particles of bran.

*Rice Bran* is the cuticle beneath the hull.

*Rice Hulls* are the outer chaffy coverings of the rice grain.

*Rice Polish* is the finely powdered material obtained in polishing the kernel.

*Screenings* are the smaller imperfect grains, weed seeds and other foreign material having feeding value, separated in cleaning the grain.

*Shipstuff*, or *Wheat Mixed Feed,* is a mixture of the products other than the flour obtained from the milling of the wheat berry.

*Shorts*, or *Standard Middlings,* are the fine particles of the outer and inner bran separated from bran and white middlings.

*Wheat Bran* is the coarse outer coatings of the wheat berry.

*Wheat White Middlings,* or *White Middlings,* are that part of the offal of wheat intermediate between shorts or standard middlings and red dog.

One of the greatest disappointments to us in our work this year, was our inability to get our annual bulletin printed. The report was prepared in March, 1913, and placed in the printer's hands, but on account of the large amount of printing that had to be done for the Legislature, the printing of the Pamphlet Laws, and the change in the public printer, we were unable to get this Bulletin until a few weeks ago. The bulletins have been mailed to those who are on our mailing list and there are copies in the office for distribution, which will be furnished to those who are desirous of having them. The bulletin has been prepared with great care. It gives the analysis of 1,400 samples which were taken by the Department through its agents and 200 samples which were sent in to be analyzed by individuals, making 1,600 samples in all. It also gives the compositions of those which were a compound feed.

Another great question before the people of Pennsylvania in regard to feed, is the numerous brands of chicken feeds that are on the markets. In the beginning of the year we had some trouble with the manufacturers of these compounds. A number were persistent in adding weed seeds to their chicken feeds and gave as an argument that the chickens are fond of them and eat them. This is true. But the law says that they shall not be sold in Pennsylvania as a feed and as they are a cheaper commodity, we hold that they have no right to enter into our chicken feeds to lower their value. There are some excellent feeds compounded and are fed with good results, but the trouble is the enormous price at which these feeds are retailed to our people. As I have stated before, in reports to your honorable body, these chicken feeds, retailing at $50 and $60 per ton, are too high a price when compared with the price of wheat at 1½c per pound, or $30 per ton, and there are a great many things used in chicken feeds that are cheaper than wheat, but people will buy prepared chicken feeds. There is a demand for it, and the man who manufactures a good clean chicken feed and sells it for a fair price, should find a ready market for his feed.

What our people need in Pennsylvania is to give more heed to the valuable information that is prepared by the Experimental Station, at State College, on the question of feeding, the valuable pamphlets which are prepared by the Department of Agriculture on this subject, the instructors that are sent out in the Farmers' Institute, the articles which are written in the farmers' journals and papers and the bulletins which are distributed by the U. S. Department of Agriculture on this great subject of what feed is and how to feed it. Some men will feed the same feed to fatten steers or hogs that they will to produce milk and then condemn the feed. Other men will feed the same feed that they feed to their dairy cows to produce milk, to their steers and hogs and then condemn the feed because it will not fatten them. If you do not know yourself how to feed properly, please secure the information from some source. When the State expends large sums of money through its Experiment Stations, as I have indicated before, it behooves her citizens to take advantage of these means of information, and in this way they will not only save money in producing food, but they will produce so much more which will go to help sustain the great population which we now have in our Commonwealth.

I wish to say that the day is past when the official of the Department of Agriculture who calls upon the feed dealers and millers to look over their stock and, perchance take samples, that he looks upon him with suspicion, but I may say they are welcome to the place of business and full information is always given, and we have been working hand in hand with the Millers' Association, the millers and the feed dealers of our State, both great and small, and we owe a large debt of gratitude to these men for their co-operation. My good friends, you have this law for your protection. Will you educate yourselves on this subject? Remember—the true way to buy your feed is on its high protein, high fat and low fiber analysis.

The CHAIRMAN: Next on the program is an address by Hon. A. L. Martin, Deputy Secretary of Agriculture, on Institute and Advirsory Work of the Department of Agriculture. I have the pleasure to introduce Hon. A. L. Martin.

MR. MARTIN: Mr. Chairman, Honorable Members of the Board of Agriculture, Ladies and Friends: I realize that I am standing in the presence of the honorable organization known within the bounds of the State—honorable, did I say? Yes, honorable with age, because for well nigh onto fifty years have you acted better your part than any other like organization of which I have knowledge. Nay, more than this; at the very inception of your organization, if records are true, and I believe they are, from that day until this present, you have stood as a mighty bulwark in the defence and advancement of a higher and better agriculture. And more than that, you have stood for the homes of Pennsylvania, for better home equipment, better school equipment and for real life upon the farm.

You have not only done this, but your work has been the most disinterestedly impartial of any work of which I have knowledge within the bounds of the State, in one or two respects. Not a dollar, so far as I am able to learn, has ever been demanded or paid to a member of the State Board of Agriculture for all this disinterested work within almost half a century. Can you point to a body of men anywhere in any State of the Union who ought to command higher respect and recognition than the State Board of Agriculture of the great Commonwealth of Pennsylvania? This is no fulsome flattery that I am speaking today, and I verily believe that the source of strength and the great power that you possess in legislation and agricultural advancement today stands by your record of disinterested, impartial work and labor during your lives for this greatest of all occupations.

Before me tonight are men who will verify what I say and who form almost a uniting link from one generation to another. I see to my left here Father Downing; I can see Father Herr over here to the right and Father Bond over her in the center, and I don't get my eye on old Father Kahler, but he has been here, and I don't know if I have missed others of these men who have, for all these years, been the great and mighty wheel horses in this honorable and noble work.

Now, my friends, as you well know, my life for the past fifteen years, has been one entirely devoted to the work which you have in hand, and you will pardon me if, at this time, I should attempt to read a brief paper, developing in a brief manner, a little outline of the Farmers' Institute work from its organization down to the present time. I have placed this in manuscript form, feeling safer than to trust myself to talking in an extemporaneous manner upon this great, broad question, realizing the flight of time and the branches and by-branches which our mind might lead us into were we to speak off-hand rather than to read; hence you will understand why I have reduced what I have to say to manuscript.

Secretary Martin then presented the following paper:

## FARMERS' INSTITUTES IN PENNSYLVANIA

By HON. A. L. MARTIN, *Deputy Secretary of Agriculture*

The history of the Farmers' Institutes of Pennsylvania, from their organization by State authority in 1887 to the present date, is an interesting one, at which date the Board of Agriculture called a meeting of its members for the consideration of agricultural interests of the State. This Board of Agriculture was and is today, composed of duly elected representatives of county agricultural societies and was placed in charge of the local management of Farmers' Institutes, which assisted in these and continued to assist under the various acts of Assembly following the Act of 1877. By Act of Assembly of 1885, the Legislature granted an appropriation of $1,000 for the actual and necessary expenses of holding local farmers' institutes. This appropriation, though seemingly small, was of great benefit to the farmers. In 1887, the Legislature increased the annual appropriation to $3,000. During 1890, sixty-five institutes were held, and in 1891, the appropriation was increased to $7,000, and that year there was a proportionate increase of institutes to 84, sixty-two of the sixty-seven counties of the State had representatives on the Board of Agriculture.

The results accruing from these early institutes in Pennsylvania cannot be well over-estimated. The work continued under the management of the State Board of Agriculture and its Secretary, Col.

Thomas J. Edge, until 1895, when, by Act of Assembly, the Department of Agriculture was established, in which was placed the Division of Farmers' Institutes. The Deputy Secretary of Agriculture, by virtue of his position, became Director of Farmers' Institutes for the State. Prof. John Hamilton, of State College, Center county, Pa., was, in 1895, appointed by Governor Daniel H. Hastings as first Director of Institutes and served in that capacity until 1899. During his tenure of office, successful institutes were held in every county of the State, interest in the work was increased and the appropriation was raised to $12,500 per annum. In 1900 I was appointed Deputy Secretary and Director of Farmers' Institutes by Governor William A. Stone; in 1901 the appropriation for this work was increased to $15,000 per annum.

To show the marked development in the work, the Legislature of 1913 appropriated for Farmers' Institutes $22,500 per annum. During the 18 years in which Institutes have been held under the Department of Agriculture, 6,634 days of institutes have been held, with an annual attendance of over 150,000 people. To estimate the benefits derived from these meetings would be a stupendous task. From the month of December until March we have five corps of lecturers traveling continually throughout the State, not including Movable Institute School Instructors, giving lessons and instructions in every department of agricultural work. At these meetings lessons are given on the most approved methods of dairy management, including feeding, stabling, care of milk, butter-making and how and where to market most profitably these products. In soil improvement, instruction is given as to maintaining nitrogen, phosphoric acid and potash in proper proportions, and that leginimous bacteria so essential in the growth of legumes and building up within the soil that most costly of all its fertility—nitrogen. The management of swine, sheep husbandry, market gardening, horticulture, bookkeeping and in truth, every line of agricultural pursuit for which Pennsylvania has been noted, is intelligentlly presented at its institutes. At least one session of these institutes has been devoted to the interest of education, such as would be best adapted to farmer and family, and we are gratified to say that Pennsylvania has established centralized schools, as well as township high schools to which the children attend and receive instructions more in keeping with their surroundings and better calculated to fit them for life's work. They also hold ladies' sessions, devoted to the interest of the country home, its sanitation, domestic arrangements, as well as the social environments of country life.

The Farmers' Institutes of Pennsylvania have long passed their problematic stage and are today filling an important place in the agricultural and commercial interests of the Commonwealth. Their system of management, although not in every respect complete, has been patterned after by many states in the Union. The continuous and increasing demand for instruction is daily coming to us from every portion of the State, which evinces the fact that the farmers of today are well aware of and are alert to the importance of adopting correct and improved methods in the conduct of their farm operations; also that agricultural chemistry and botany have, within the decade, developed facts, without a knowledge of which no tiller of the soil can expect to succeed to any considerable extent. To the work of analyzing and developing these fundamental truths and lessons, the Farmers' Institutes of Pennsylvania are devoted.

I herein present a tabulated attendance of Farmers' Institutes from the time of their organization, under the Department to the present:

COMPARATIVE STATEMENT OF WORK FROM 1895 to 1913, INC.

| Year. | Amount of appropriation. | Number of days institute held. | Number of lecturers employed. | Number of sessions held. | Average per session. | Total attendance each year. |
|---|---|---|---|---|---|---|
| 1895, | $7,500 | 264 | 82 | ........ | ........ | 46,004 |
| 1896, | 7,500 | 380 | 82 | ........ | ........ | 50,000 |
| 1897, | 7,500 | 305 | 50 | ........ | ........ | 50,000 |
| 1898, | 7,500 | 311 | 85 | 791 | 108 | 85,346 |
| 1899, | 12,500 | 322 | 60 | 816 | 183 | 149,555 |
| 1900, | 12,500 | 335 | 59 | 848 | 170 | 144,328 |
| 1901, | 15,000 | 324 | 51 | 782 | 185 | 144,401 |
| 1902, | 15,000 | 327 | 52 | 831 | 148 | 123,184 |
| 1903, | 17,500 | 325 | 54 | 804 | 178 | 142,964 |
| 1904, | 17,500 | 324 | 57 | 862 | 175 | 150,902 |
| 1905, | 20,000 | 393 | 53 | 987 | 168 | 165,558 |
| 1906, | 20,000 | 392 | 56 | 981 | 150 | 146,915 |
| 1907, | 20,000 | 404 | 68 | 989 | 182 | 180,218 |
| 1908, | 20,000 | 394 | 78 | 982 | 189 | 185,812 |
| 1909, | 22,500 | 438 | 69 | 1,061 | 200 | 205,886 |
| 1910, | 22,500 | 477 | 75 | 1,100 | 200 | 209,393 |
| 1911, | 22,500 | 481 | 70 | 1,185 | 162 | 191,213 |
| 1912, | 22,500 | 438 | 54 | 1,075 | 163 | 188,273 |
| Total, | $290,000 | 6,634 | 1,109 | 14,094 | ........ | 2,548,186 |

During this period of practically two decades, should time permit, it would be exceedingly interesting and instructive to draw a line of comparison between the attitude of the farmers towards these meetings in their early stage and that of today, also methods employed and implements used in the cultivation of the land and harvesting of crops. In dairying, an entire lack of system prevailed, the careful breeding of the dairy cow was little thought of, the old family orchard was practically the only source from which fruit for the market was derived, the question of soil-building had only begun to interest the more progressive farmers. Largely as a result of teachings developed at Farmers' Institutes and Movable Institute Schools and kindred organizations, the farmer is rapidly learning how he can best feed the world and at the same time year by year maintain and increase the fertility of the soil he cultivates. The solution of these problems and a score of others of almost equal importance, the Farmers' Institutes of Pennsylvania is joining with the rank and file of farmers to properly solve.

As an outgrowth of instruction given at these meetings and at the call of the farmers of our State, the last Legislature appropriated $40,000 for the employment of 10 farm experts or advisers, whose appointment went into effect on August 1st last. The work of these experts is divided as follows: Soils and Farm Crops, R. P. Kester, Newtown, Pa., and Prof. Franklin Menges, York, Pa.; Dairying and Animal Husbandry, Dr. M. E. Conard, Westgrove, Pa., and L. W. Lighty, East Berlin, Pa.; Poultry, W. Theo. Wittman, Allentown, Pa., and Frank Kline, Spring City, Pa.; Farm Drainage and Water Supply, Chas. G. McLain, New Ringgold, Pa.; Market Gardening and Fruits, Sheldon W. Funk, Boyertown, Pa.; Co-operation in Farming, E. B. Dorsett, Mansfield, Pa.; Home Sanitation and Household Economics, Mrs. Jean Kane Foulke, West Chester, Pa. These advisers are an outgrowth of the Farmers' Institutes, at which teachings have been carried on for many years outlining a system of Crop Rotation and Soil Improvement, methods along every line of Dairying and Animal Husbandry, the Poultry interest that is making such rapid progress in Pennsylvania is calling for help from many sources, in the matter of farm drainage and water supply the future success of many farms depends. With the demand of greater supplies of garden stuffs and fruits, especially farms surrounding our cities and towns, an important field is covered by our advisers in this branch, co-operation in farming is also of vital importance, as well as the sale of farm products where shipping can be more economically carried on in carload lots. The only lady member of this corps, having in charge Home Sanitation and Household Economics, is being supported in her work by practically unanimous effort of the Grange, Women's Clubs, and all persons who are interested in the betterment of the Farm Home of the State. From the time they have been in the field, that is, August 1, until December 1, over 2,000 farms have been visited.

In this connection I desire to say a word with regard to work performed by the lady adviser, Mrs. Jean Kane Foulke, who undertook and successfully carried out, through the kind co-operation of the Lehigh Valley Railroad, the equipment demonstrating the best methods of Home Sanitation in the disposal of sewerage and water supply, domestic science; and, in fact, most of the important equipments for a Sanitary Home, especially emphasizing the utensils that go to relieve burdensome labor in the home. This car started at Athens, Pa., and ended at Easton, Pa., stopping at various stations along the road, and was visited by 6,500 people, many of whom were wives of farmers.

At the beginning of our institutes, December 1st, we found difficulty in removing our corps of advisers from the field and transferring them to institute work, on account of hundreds of requests for their services, thus emphasizing the general assistance and welcome given on the part of the farmers to our corps of farm advisers, which differs from most other systems of kindred work, in that it embraces practically every line of farm operation carried on within the State, hence it matters not whether you are a dairy farmer, fruit or market gardener, following a line of crop rotation, engaged in poultry business, should your land need underdrainage or planning for system of water supply for your house or barn or is your community interested in organizing a co-operative system of growing crops and marketing the same? In all these various lines the State has provided the funds for supplying you an adviser who will come to your farm home free of cost and assist you to the extent of his ability in the development of your respective condition.

SECRETARY CRITCHFIELD: Mr. Chairman, before you proceed with the next topic, I want to say that I enjoyed Mr. Martin's paper very much; but I don't see why he discriminated against me; when he was talking about the fathers, he spoke of Father Herr and the gentleman from Hughesville, Mr. Kahler, but he didn't say a word about me; that must be owing to the fact that for some years past I have been travelling with the great grandfathers.

PROF. SURFACE: Tomorrow morning, beginning at 9.15, I shall have a demonstration of the scale parasite, showing the specimens under the microscope, by my assistant, Prof. Musgrave at this window. Also, we are taking a few more orchards for demonstration purposes in this State, and if any members of this Board know of any place where a demonstration orchard is needed, with express regard to demonstrations in improving and spraying, I shall be glad to have them confer with me some time tomorrow. I will also state that there are some pictures of my own orchard on exhibition there in the front of the room, leaning against the desks.

The CHAIRMAN: Next, is an address on "Domestic Science and Rural Homes," by the only lady member of the Board. It is my privilege and pleasure to introduce Mrs. Jean Kane Foulke.

Mrs. Foulke spoke as follows:

## DOMESTIC SCIENCE AND RURAL HOMES.

By MRS. JEAN KANE FOULKE, *West Chester, Pa.*

Mr. Chairman and Fellow Members: I regard this as a great opportunity and a great pleasure. In the first place, I have filled two places on this Board; I understand I am the only woman member of it and I am the baby of it, also; I am a grandmother, and that shows that this Board must be a pretty old Board; so I feel, as I told you, that it is a great privilege to be here and address you tonight.

I wish to take advantage of the opportunity thus given me to draw your attention to and enlist your sympathy in the work I have been doing and the work I hope to organize and do for the rural homes of Pennsylvania. My appointment to the position of Farm Adviser in Home Economics and Household Sanitation is couched in such terms that I am in a position to deal and treat with any conditions pertaining to home building in its broadest sense. The only question of limit to the scope of the work would seem to be, by own personal limitations and ability, and possibly, the matter of funds to carry the work on. Mr. Martin sent for me immediately after my appointment to discuss with me how I was to begin, or rather how and where I was to begin my work. Both he and Secretary Critchfield were ready and willing to help and co-operate with me in any way that they could that would help to develop and benefit the rural homes of the State.

The first step seemed to me to let the people know of my appointment and what it stood for. The idea of any State aid or a department for instruction and help in home making and especially adapted to meet the needs of women as home builders, was indeed an innovation. It is difficult to awake the women themselves to the fact that the woman of today, especially the farm woman of today, must have special training and equipment to be her husband's companion and partner. Far greater than ever before are the demands on her for making the house a home, not merely a shelter and greater than ever the need that she should enter into his life and develop her own on a broader scale than was possible to her mother and grandmother. It is difficult to make her realize that to do this she must have up-to-date appliances to work with and the knowledge of how to use and care for them, a knowledge of food and fabrics, of health and sanitation, that a generation ago was unknown. To go into the homes of a proud, self-respecting and sensitive people and suggest changes of any such kind is a difficult proposition, and if the suggestions are to be helpful they must be given with tact and understanding, with sympathy and not pity. And last, but not least, the person undertaking such work must be able to give real intelligent help, to teach better ways of living and doing rather than different ways.

An added difficulty to all this is the lack of ready money on the most of our farms with which to make improvements or changes, even when the need of them is recognized, and care must be taken by the person who wishes to teach and help, not to suggest things that may be desirable, but are impossible, for by so doing it is easy to sow the seed of discontent and unhappiness in the hearts and homes of the very people we wish to help, thus destroying the reason and desire for home building and rather helping in the disintergration of family life in the country—that bond which, after all, and under all, is the essential to the well being of our nation.

When I came into office the Department already had one excellent bulletin, "The Principles of Domestic Science," and with that and what I myself stood for was its only equipment for the new line of work that it was understanking. But even so, we have done much toward a better organization and are developing many lines of work and I feel very hopeful regarding the possibilities of the future. Mr. Martin's knowledge and appreciative understanding of the work to be done has been of the greatest help. It was with his consent that I was able to take advantage of an opportunity in the early Autumn to take a car, demonstrating household matters and home economics over the Lehigh Valley railroad. This was arranged through the courtesy of its Agriculturist, Mr. F. R. Stevens, who realizes that a successful farming community means a happy, healthful, educated community and that to have such, we must have, first, good up-to-date homes, in which may live happy and content men and women and healthy, happy families of boys and girls. Homes where people may have good food, good water, good drainage, good houses—in fact, such homes that the people living in them may be able to make good incomes and be good citizens, and form a community where other people wish to come and settle. The railroad furnished the car and attended to its running on scheduled time from place to place. The exhibits and instructions given were under my charge and direction. We had on exhibition, working models of many things pertaining to health and comfort in the home. Among the most interesting were the models showing the possibility of plumbing and water supply in the farm house, with a sceptic tank and sewage system connected, all within the reach of the average farmer's pocketbook.

We had a demonstrator at hand to explain how much of this might be installed by the man himself at little cost, beyond his labor. Model beds and bedrooms, model door yards, model working dresses for adults and clothes for children, with explanations of the time and cost of making, and of the different points of value as to color, fabrics, cheapness, etc. An exhibit of kitchen utensils, washing machines, churns, bottle sterilizers, steamers, fireless cookers, etc., as well as samples of our free travelling libraries from the State Library, etc.; bulletins from our health department and other departments, all pertaining to health in the home, and household economics. We also had a cabinet or closet planned for use in one room or small schoolhouses in giving lessons in domestic science, fully equipped with tins, alcohol stove, fireless cooker, etc., and with prices of the details and total complete and specifications as to how to make the cabinet. Besides this we had domestic science lectures every day and demonstrations as to how to cook and use cheap meats and foods properly.

Also, Mr. Kline, one of the State Farm Advisers, was with us and had an exhibit of a model poultry house and other poultry appliances and gave interesting short talks and explanations of his methods of how to raise chickens and eggs, with plans suitable to the small producer who usually is the farmer's wife. I myself spoke daily, often several times a day on general topics pertaining to the home and home life and home economics in the broadest sense. I wish you gentlemen could have seen the eager crowd of men, women and young girls and boys who crowded through the car day after day coming for miles to see and ask for instruction and help. Frequently women would come in the morning and go back miles to their homes to bring their husbands in the afternoon to see and learn also. The children from the high schools and grammar schools were brought to the car. In many cases, where this was not possible, I went myself and addressed them in the schools urging the love of and pride in their homes and their duties there. It was pathetic to see their craving for books and desire to learn how they could acquire the use of the travelling libraries. This was especially noticeable in the little boys who crowded around the libraries from the time the car opened until it closed. The storekeepers came to see the household appliances and to order duplicates for their customers; and even today I am still getting letters asking me about this and that and where it can be bought.

While our coming was not advertised more than by a few personal letters sent to acquaintances here and there down the line, we had to have halls to hold the crowds who came to our meetings as the car would not contain them, and in every case, with one exception, there were offered free by the community in which we stopped. I have lectured from a box in the middle of the road, from the end of a car, in churches, in halls and schools, anywhere where we could get room for the people to sit and hear, and this seems to me to show that the homes of our State are ready to be helped if we will only show the homemakers the way. I have visited many parts of the State of Pennsylvania, to speak to teachers, urging on them to teach Domestic Science or Home Economics and explaining simple methods of doing this, even in the small rural school. A great difficulty here is that a great many of our young teachers are not themselves competent to give such instruction, and are scared from making an attempt to even teach what they know, because the name domestic science, is so formable, not realizing that it should mean instruction in the simplest form of so-called housekeeping properly made beds, well aired rooms, simple plain cooking, indeed merely house work done in the best and easiest way, but with an intelligence that is labor saving and economical in time and money.

I am anxious to work with the Department of Education in this line and would be glad to go to any part of the State to meet parents and teachers in an effort to explain how important it is for our young people and their homes to have such things taught in practical lessons, both at home and in school and to awaken in them a civic pride that stands for good citizenship. I find that I must have circulars and bulletins to send or leave with people I am trying to help, bulletins dealing with the preparation of food, with diets for the sick, with care of infants and children, arranging and furnishing a room and homes, the conservation of strength, efficiency in the general work of the house, such as sewing, laundry care of clothes, beds, bedding, bread and cake making, bulletins treating of the care of water supply and drainage, the way to start and run clubs for civic and home betterment.

All these things and many more are needed to help and brighten and enlarge the outlook of the people living in our rural homes. To teach them the importance of knowing how to serve and spend, how to work and rest, and live, to grow and develop, awake them to their civic duties and possibilities. I must find ways and means to arouse parents to their duty and the possibility of bettering by their personal and actual interest, the surroundings of their children in the school as well as in the home. To teach the children and parents how the home and school must co-operate, to help women to run their homes in a business-like way and to market their eggs, chickens, butter, etc., so that they can get the best prices for their product by work co-operatively for and with each other. You can see for yourself what a great undertaking it is.

The small towns needs as much of all this as the rural homes and indeed the families of each are so closely allied that in most cases the same interests affect both communities. Therefore, I have been visiting many small villages and towns, speaking to the citizens of their home and civic duty, the care of their wells and water supply, drainage and lack of drainage, lighting and cleanliness of the streets, beauty to their yards and houses, their need to have good home economics in the schools and to practice it at home and to make the lessons taught in the schools of real value.

Everywhere I go in institute work or as a Farm Adviser, my suggestions and plans have nearly always been met with interest and gratitude by the people I come in contact with and I have hundreds of women come to me for advice and sympathy. Men, too, seem to feel the need of understanding and help in their efforts to make homes and have come to me for suggestions on almost every topic connected with their lives and work. The field is so wide, the need is so great that we have as yet but touched the surface of what there is to do, and I shall need more help. I can organize it and do much of the work but I cannot do it all alone. We will need other teachers, experts on many lines to send over the State to meet the varying needs of various localities before long. I shall need the help of this Board and the Department of Agriculture and every official and department of the Government, every citizen of the State. They must all help me, no petty jealousy must creep into this work for it is for the benefit of the homes, our homes. Alone I must fail. I am like Moses when he was in the battle where he won while he held his arms aloof, but when he became fatigued and they fell to his side, the battle went against him, then Aaron and Joshua, his brother and friend, came to his aid and held his arms up and the tide of battle was again changed and he won. My arms are still aloft, but the burden is heavy and I need your help.

The CHAIRMAN: Next, is an address by Hon. Samuel W. Pennypacker, Ex-Governor and Member of The Public Service Commission.

SECRETARY CRITCHFIELD: I am very sorry, Mr. Chairman, to announce that I had a letter today from Governor Pennypacker, saying it would be impossible for him to be here.

The CHAIRMAN: Next, is an address on "Labor and Safety Laws of Pennsylvania," by Hon. John Price Jackson, Commissioner of Labor and Iudustry.

MR. JACKSON: Ladies and Gentlemen: If I could speak to you as gracefully and as interestingly as the preceding speaker, I would go into politics instead of merely being a State official. I also must read my address to prevent spreading over too much time, so I will follow the fine example of my predecessor, Mr. Martin.

Mr. Jackson then presented the following paper:

## LABOR AND SAFETY LAWS OF PENNSYLVANIA

By HON. JOHN PRICE JACKSON, *Commissioner of Labor and Industry*

During the past several years, your Commonwealth, at your bidding, has been doing a magnificent work in conserving the natural and human resources of the State and enabling them to be utilized to the best advantage and without waste. Thus you have heard, or will hear, of the great State Forestry Reserve, already a million acres in extent, which is destined to protect the moisture available for the soil on your farms and also to prevent the actual removal of that soil through erosion. You, yourselves have had a large hand, with our strong State Department of Agriculture and with the co-option of the Pennsylvania State College, in helping the farmer to use his land to the best advantage and keep it in the State of maximum fertility. It has been a great work, Secretary Critchfield, and this Board and the farmers of Pennsylvania owe you and your force thanks. You have heard of the way in which the Department of Agriculture is leading the nation in preserving the foods pure and healthful and in eradicating the epidemic diseases among animals and the ravages of insects, and has been carrying on institutional and other valuable work. You have heard or will hear of the work of the Fire Marshal in preventing the enormous loss of property, as well as life, through fire, and of the waterways work which is destined, through the intelligent direction of the Waterways Commission, to harness our streams in order that destructive floods may become unknown, that our waters may run strong, even in the dry seasons, and in order that our great wealth of water power may become available to our people. And all this can be done at a cost which will be paid for in a few years from the saving which will be occasioned by preventing floods. They are doing it in Germany. It is a great work and should have your backing. You have heard or will hear of the large work which is being done by the State through the Highway Department in advancing the ease of inter-communication between our communities and the resultant reduction in the cost of moving farm products to their destination. You have heard of the great conservation of life which has been going on through the Health Department by making the drinking waters of Pennsylvania pure, having her sewage disposed of properly, and by reducing epidemics and contagious diseases.

This afternoon you heard of the enormous work the State is carrying on in preparing youth for their work in life, a work which is now in a great state of transition and is being effectively and practically handled by the Department of Education. We started our public school system many years ago to prepare youth to do the work they had to do; ten years ago we made some changes, and now we are distinctly making a move ahead and we are making a move to more directly prepare the boy or girl for his vocational life after he has reached his full age. You have heard, in this same connection, of the unusual revival or the unusual extention work which is being done by your State College in carrying both to the rural and industrial districts information which cannot well be otherwise obtained than through the medium of your State College. In like manner you have heard at these sessions of the care of our fish and game, the useful publicity carried on by the government, including the farmers' institute work, of future legislation. which is desirable for the general weal, of proper protection from the criminal through the State Police, and of the proper handling and development of public utilities.

Your Secretary of Agriculture might well have added to these other expositions of the work which is being done by your administration, that carried on by the Department of Public Buildings and Grounds, which has developed a system of purchasing and accounting probably unequaled in any other state of the Union. I mention that tonight because I understand, and I have made some little investigation, that there is probably no state in the Union that has a more perfect or more efficient method of purchasing for State purposes and handling all that business end of the government. Please bear that in mind, and if anybody says anything to the contrary, make them prove it, for I happen to know, because I have studied the systems of all the states in the Union.

SECRETARY CRITCHFIELD: Allow me to state right there that I spoke to Mr. Rambo—we all know he is a very modest man, but above that, he is a very busy man, but he has not been very well and could not come, and I said, "We are very sorry you cannot be here."

MR. JACKSON: I am glad to know that the Secretary did not leave out Mr. Rambo, whom he appreciates as much as I do.

Let me say now that in many of these things, if I may use a slang expression, I am a greeny, I just came down a few months ago, I was nothing but a pedagogue and you know how good for nothing a pedagogue is, but sometimes they have their eyes open and I have been rather wide awake in studying these movements in other states, and I find that quietly and slowly this State has forged ahead of the great bulk of these State movements for helping the people by giving improved methods, by making savings, and so forth, has forged ahead of the great bulk of the states of the Union. If you doubt it, I dare you to spend one day under this roof going from department to department and getting them to tell you what they are doing; then I dare you to come to me and deny my statement.

Now, furthermore, I want to say that this, in many ways, is the greatest state in the Union to deal with such problems. We have our little city of Philadelphia, about two million people. New York city has, I think, something like five millions. New York State has about nine millions, leaving between four and five million population for the state, outside of New York city. Pennsylvania has about eight million, leaving about six million population for the State outside of Philadelphia. You take out these few big metropolitan cities, and Pennsylvania is the greatest state in population in the Union, and if you are in a position ever to travel from point to point and visit all the little towns scattered over Pennsylvania and see the prosperity, see the active energy and industry of our people, you cannot fail to end that trip with great pride. I cannot help saying these things, people, because they are bound up in me, and when I heard, down in Philadelphia the other day, the Secretary of one of the great charity organizations of Pennsylvania, get up and say that the Pennsylvania people are beyond the possibility of being worth while—he used stronger language than that—because some of them are Quakers that won't move—I'm a Quaker myself—a lot of them are Pennsylvania Dutch, who are thickskulls—the other half of me is Pennsylvania Dutch—the rest of them are Scotch Irish, who are cranky—now, he gave a most terrific talk about us Pennsylvanians, and yet that audience applauded. Let's quit that and let's form a booster society and get busy and stand up for Pennsylvania.

I got off my subject; I'm afraid I'll take too much time, Mr. Secretary. I am before you for a few minutes this evening to take up another phase of State activity which is no altogether new, but which has been so broadened in its scope and powers as to make the subject one of some interest to all people in the Commonwealth, namely, the safeguarding of the industrial people of the State. It is particularly fitting that this body should take an interest in this work, particularly because farmers as a class are interested and active supporters of all good movements tending toward the welfare of the people, whether or not the subject relates to agriculture, and particularly because you represent one of the greatest industries of the State and are in large measure subject to the laws having to do with industrial pursuits.

The Department of Labor and Industry was established by Act of Legislature and the approval of the Governor, on June 2d, 1913. The law states that "all rooms, buildings, and places in this Commonwealth where labor is employed, or hereafter shall be employed, shall be so constructed, equipped and arranged, operated and conducted, in all respects, as to provide reasonable and adequate protection for the life, health, safety and morals of all persons employed therein. For the carrying into effect of this provision and the provisions of all the laws of this Commonwealth, the enforcement of which is now or shall hereafter be entrusted to or imposed upon the Commissioner or Department of Labor and Industry, the Industrial Board shall have power to make, order, amend and repeal, general rules and regulations necessary for applying such provisions to specified conditions and to prescribe means, methods and practices to carry into effect and enforce such provisions." In other words, the law relating to the workers of the Commonwealth is that hereafter all places shall have reasonable and adequate protection for the life, health, safety and morals of all persons employed therein.

Further, an Industrial Board has been created, which has the right and power to make and carry into effect such rules and regulations as may be necessary to obtain this adequate and reasonable protection, while at the same time was organized the Executive Department of Labor and Industry, whose duty it is to enforce such rules and regulations. I am glad to see such a law on the statute books, and if, with my staff, we can carry out the ideals of the men who drew it and the Legislature which passed it, we will do a service to Pennsylvania. As illustrating the methods which are pursued by the Industrial Board, I might point to the work which is being carried on with reference to places of amusement, such as picture shows. As you are well aware, such places give admission to millions of people during the year. If they are overcrowded or wrongly constructed, the cry of fire, the smell or sight of smoke or any other untoward event may set up a panic with the resultant loss of much life and the crippling of many persons. The American, as a rule, is careless of his own safety and depends largely upon the man in charge to see that he is safeguarded. Even our genial Secretary of Agriculture, if he is in a hurry and thinks he needs to make an engagement, will jump right before a trolley car and take the chance of being run over. That's the way we all do here in the United States. How about that, Mr. Secretary?

SECRETARY CRITCHFIELD: I guess I'm guilty.

MR. JACKSON: It is very foolish. As a matter of actual fact, the picture shows of Pennsylvania have in a regretably large number of instances been lacking in proper protection to their patrons. Possibly the most horrible proof of this occurred in the case of the Boyerstown disaster some years ago. The Department of Labor and Industry has arranged with representatives of the picture shows, some of the architects of the State and others, to make tests for the purpose of determining just what constitutes safety in such an establishment. Thus, this committee, with the help of the Department, will select a large number of such places and will have the audiences, at a signal, rush out through the exits as rapidly as they can without injury one to another. By such practical means it is hoped to determine how wide should be the aisles, their number, how large the exits, the dimensions for stairways, and a host of other details of prime importance.

In addition to this, the committee will gather together a number of old reels or films, such as are used in picture machines, and by setting them on fire have a practical way of testing the various types of fire-extinguishers at present available. Having obtained this information, it will be submitted to the Industrial Board with recommendations. The Industrial Board will then give careful consideration to these recommendations, and will, after consulting various experts, formulate regulations, which would safeguard the people to a maximum degree when attending such institutions of pleasure. In like manner, the Industrial Board will take up various other establishments where people are employed or where they gather in large numbers. That is the way we expect to go through with all of our work and have already started to do it.

I have spoken for a moment in the paper about the question of fire in a factory. I will read a few words of that. Thus, for instance, the fire hazard in the textile mill or tobacco manufactory is often enormously great. There may be six floors to a large building, each floor containing from two to three hundred girls and women. This building may have one, two, three or four stairways. Possibly one or two of these are fire-proof, and yet a holocaust may occur of the most terrific nature. This, upon the cry of fire, the several hundred girls immediately fill these stairways. The first floor stairways at once become choked by the girls upon the second floor, and those from the floors above who manage to get through crush down upon those who are already caught near the bottom in an inextricable mob. The result is, therefore, a terrific loss of life and limb. To get twelve hundred girls down a stairway in an incredibly short time, as is attempted in a panic, or is needed in the case of a quick fire, is ordinarily an impossible task. As a result, gentlemen, I say to you now, there are scores of places in your Commonwealth where at any instance of the day may happen a catastrophe which will make the whole State weep. There is a great problem before us in this matter. Thus, we must learn to make stairways and fire-escapes which will really answer the purpose, to build fire-towers,—which are nothing but fire-proofed inside stairways—or to use fire walls.

The only satisfactory method which I see for handling such large numbers of people is to use the fire-wall; that is, to have the buildings divided into two parts by a fire-resisting partition. If then, a fire occurs on one side the girls or occupants pass to the other and before the fire can possibly get across from one side to the other they have plenty of time to descend leisurely and make their escape. This solution, however, is not always possible. Our present little iron fire-escape has possibilities of a ghastly nature which are blood-curdling. Thus many times it has happened that human beings have crowded out on the platforms of such escapes to be fried and frizzled in flames belching from the windows below. And yet we have to use those fire escapes more or less, in some cases, they are better than nothing.

Now this work does not apply only to manufacturing industries and the railroads and places of amusement, and so forth, but also to the farmer. We have numerous instances of accidental deaths, broken limbs, blindness, the loss of fingers and other injuries which have occurred through avoidable accident on the farm. The newspapers do not, as a rule, speak much of such accidents, as the farmer or his employee is inclined not to push himself into the public print and the reporter of the paper in most cases has no means of learning of the accidents. I don't believe there is a man here who does not know some man on the farm who has been injured in carrying on his work, and I expect most of you can name a number; I can name a number and I have not been on a farm very much since I was a boy. Nevertheless, I venture to say that there is not a man in this audience who does not know of one or more farmers or farm employees who has not suffered some serious accident, or was permanently maimed through accident occurring in his vocation. As in the case of machinery in the shops, one-half of these accidents can doubtless be avoided by proper precautions. Do the feed cutters, the threshing machines, the traction engines, the mowing machines, the reapers, and so forth, have proper guards to prevent accidental injury to the operatives? Remember, a man may be in love, he may be overburdened with worry, he may be just so joyously happy. that he forgets to think about himself for a moment, and just at that instant the accident occurs. That happens to the keenest minded of us now and then. Are the stairs, the barn mows, etc., properly protected at dangerous spots? Are the many other places where men work on the farm, which by a little thoughtlessness might result in an accident, properly looked after to make them safe? Don't be complacent; remember the old Quaker farmer. Mr. Secretary, just tell them about that farmer, the one with the wooden leg.

SECRETARY CRITCHFIELD: Well, now, Mr. Chairman, that's taking advantage of me. That story is about a fellow over here in Berks county.

MR. JACKSON: That fellow that was so good-natured and thought everything was right.

SECRETARY CRITCHFIELD: This man had a beautiful crop of wheat growing. It was remarked all through the community that it was the best crop of wheat to be found anywhere within ten miles. Just about the time that wheat was in blossom, there came a severe hailstorm and knocked it into the ground. One of his neighbors came along and said: "Hans, this is certainly very bad, very bad that you should have lost your fine crop of wheat." "Oh, no, that was just right, you see I had a double crop on that field last year and a crop like that this year was more than the ground ought to be expected to do. The Lord knew better than I did, and so He sent the hail and knocked it into the ground, just where it ought to be." The man went on, but he got no comfort out of that view. A little while later that farmer's house burned down and a neighbor met him and said: "I heard your house burned down, that's very bad." "Oh, no," he replied, "that's just right; Betsy and I have lived in that house ever since we've been married, and here we've raised our family and they have gone and we have a good bank account and we were thinking of building a new house, and now that the old house is gone, all we've got to do is to build a new house; that was just right." Then he got on the mowing machine and the cutter bar struck some obstruction and threw him down in front of the bar and one of his feet was so badly mangled that it was necessary to amputate it, and he went to the hospital and stayed there for a long while, and some time in the winter his neighbor saw him and said: "Hans, now I guess you've found out something can happen to a fellow." "Oh, yes," he replied, "but that was just right; I always had some trouble with my feet and I would come into the kitchen and have to stick one foot in the stove oven and then the other, and now this is a cork foot and I only have to stick one in the oven."

MR. JACKSON: I wanted the Secretary to relate that to show that it was not wise to be complacent and let conditions on the farm stand when we might fix them. We are complacent, not fearing danger, and yet these things should be corrected, it means an enormous economic loss in the year, when you come to add it all together. My own experience as a young man who was brought up largerly on a farm is, that these dangerous spots are not by any means properly protected, nor have I observed in my later years, in visiting farms, that any great improvement in this regard has taken place. If we add together all of the cases, annually, of accidents which occur on the farms which might have been avoided, the sum total for the Commonwealth of Pennsylvania would be very large and would represent not only a great amount of suffering, but a large economic loss through the waste of time involved in recovering or the waste of labor involved in the loss of life.

I therefore wonder whether it might be well for the Department of Labor and Industry to call upon you to appoint a committee to confer with some of our force, with possibly the addition of an expert or two from State College, to study the machinery and conditions on the farm with reference to the safety of those employed thereon. It strikes me that by doing so, it might be possible for such a committee to obtain results which, if published to the farmers of the country, would result in a great lessening of the present unsanitary conditions. You may well smile at my seriously suggesting this project, but, nevertheless, statistics, so far as they can be found, will show it to be worthy of your consideration. It might also be worth your while at the same time to have this same committee in connection with representatives of insurance companies, test the best methods by which the farmer can protect his property from loss by fire, which is, as we know, not an insignificant waste.

The Department is now co-operating with the Department of Agriculture in gathering statistics having to do with the grain production of the State, our part being more particularly their manufacture into flour. You know and I know that the milling industry in Pennsylvania has gradually deteriorated and gone down, until today it is a small fraction of what it was compared to a number of years ago. Undoubtedly that should not be the case, and it is our duty to try to find out the reason and to find out how that industry can be renewed to the advantage of the farmers of the State and to those that are in the milling industry. The laws of Pennsylvania require all employers of labor, without reference to the characteristics of their business, to report accidents to the Department of Labor and Industry. We have received few such reports from the farmers and would find difficulty in collecting such statistics withour present force. I believe, however, that such statistics should be gathered in order that the truth of the statement I have made above may be firmly established and it will be my hope to endeavor to arrange a method whereby such statistics can be gathered in the future. By means of these accident reports, of which possibly one to two hundred thousand will be received by us during the year 1914, we can lessen the number by improving the dangerous places. Just think, it will be nearer two hundred thousand serious accidents, requiring a lay-off of a few days, or more than one hundred, so far as our present reports indicate. Thus, for instance, if one establishment has fifty accidents during the year and another has two, our Department will make a study of the two establishments and recommend to the one having the great loss the methods by which the other one avoided the danger.

No greater work for helping the prosperity and happiness of Pennsylvania seems to me to be available. The State College is co-operating to educate the people along the lines of safety first. The Department of Labor and Industry is required to see that the labor laws are properly obeyed. We are carrying on more or less educational work. It is of an informal nature and we are making use of our State College as a co-operating hand in that work very much as the Agricultural Department is.

Now, the labor laws have certain radical features, such as this: No child under fourteen may be employed continuously or in industrial establishments, nor may children between the ages of fourteen and sixteen be employed unless they have certificates from the educational authorities, indicating that they are capable of reading and writing. Furthermore, no child under eighteen who is not physically competent shall be permitted to work for a wage. There are many dangerous industries where boys under eighteen may not work No woman under twenty-one years of age is permitted to work after 9 P. M., nor any woman in a manufacturing establishment after 10 P. M. The morning hours for starting are not earlier than 6 A. M. for women under twenty-one and boys under sixteen, except in special cases. With fifty inspectors and a total force of seventy people in a population of nearly eight million, what are we to do in enforcing all these laws and doing all the other things I have been telling you about and a great many more I cannot touch upon in this short talk? We can do an enormous work by having the help of all of you and all right-minded people and by having your confidence. These labor laws, however, have not been so construed as to apply to the farming industry, and therefore I bring some of their principal points to your attention purely because you are citizens of Pennsylvania who are particularly capable of appreciating the necessity of guarding our youth from being stunted and weakened for their future life's work and in preventing our women from being so injured as to be incapable of bringing forth a stronger and healthy future generation. Probably no activity is more desirable than this or will do more toward making the people of Pennsylvania healthy and strong and capable, and I have taken more time than I should, because the object of this movement is to protect you while in the state of puberty and the young woman whose body is developing the capacity to be a mother. My paper was just twenty minutes, but I have interlarded things and drawn it out and am deserving of censure.

In closing, let me say that it is of some general interest to know that this Department, in its six months of life, has installed many tens of thousands of guards upon dangerous machines throughout Pennsylvania; several hundred toilets have been installed where sanitary conditions required; hundreds of children illegally employed have been discharged and several scores of employes have been successfully prosecuted for breaking the labor laws and the safety laws. A very large amount of information has been disseminated among the industrial people of the State, which should be a material influence in enabling them to reduce our present enormous waste of human life, health and property to much lower figures, and many other activities have been vigorously undertaken. We ask your cooperation, just as I presume every representative of the other State Departments did, and the only other thing we ask is that if any one of you doubts the great work that is being carried on under this roof and if any one therefore does not feel like helping it, let him come and visit and look for himself, and after he has found out, get behind these little bits of picayune forces and help to make them mighty forces of good in the Commonwealth.

MR. HUTCHISON: I would like to ask the Dean a question: Does this law give you power to visit the shacks, the miserable housing of the laboring people of the mines where they are employed by the corporations, that tonight are sleeping in places where you wouldn't keep your animals? Can you do anything to help those people under this law, in their housing and sanitary conditions?

MR. JACKSON: I will answer Mr. Hutchison in this way, that the law under which the Department is operating does give comparatively little power in that direction; but the Department of Health has full power, and the power that the Department of Health has, combined with the power that we have, I believe entirely covers the project. There is a great deal of activity today to remove the really terrible conditions in which many of our laboring population, especially the Italians, find themselves or by which they are surrounded. I believe that it will not be long before material improvement is made in all the bad spots of the State.

MR. HUTCHISON: That answers it.

SECRETARY CRITCHFIELD: A condition exists in our Commonwealth, that almost makes us blush with shame, to see the women that labor and do the cooking and maintain those homes and men who live in mansions deriving the benefit of their toil and do not seem to move their hands to help house them in any condition. There's only a few places or spots in this Commonwealth where you will see them properly housed. These men have souls, these women are just as other people, after they are here a while under our flag, but how can we expect citizens to be made out of people when corporations, large firms, will house them in shacks of this kind in zero weather? If there is any power of the law in any of these departments, I pray that it may be extended to those poor people in their unfortunate condition.

MR. J. ALDUS HERR: In reference to what you were saying of accidents on the farm that the employer is responsible for—I had a man and two days ago I sent him with my team to the mill. He hitched up a horse that he hadn't any business to put in the near side—he had been told to put him on the other side—and he ran away and the man was hurt; am I responsible for that?

MR. JACKSON: I would be very glad if the Chairman would call on the Attorney General to come down and give you an answer in that case; it's too much for me.

MR. J. ALDUS HERR: It has been spoken about in our county. Most of the farmers in our community are against it.

MR. JACKSON: Against the Compensation Law?

MR. J. ALDUS HERR: Yes, sir, I will be frank with you, just for that reason, that we don't know where to discriminate, and most of the accidents that do occur are caused by the carelessness of the person who is working around.

MR. JACKSON: Let me just say something to you gentlemen. It may be that a compensation law is not the right thing for the rural districts, I won't say that it is, but I do want to say to you men that a compensation law for the manufacturing industries and the transportation industries—the railroads I speak of—and industries of that class, is the only kind of humanity which you or I or anybody in this State should stand for. If it is not right for the farmers, have the proper exemptions made in the proper way, under the advice of the Attorney General, but do not do the State the enormous injury of preventing compensation for accidents in the other industries. I have no personal interest in this, gentlemen, absolutely none, you know, unless I get hurt, and then the State, I suppose, will have to pay me, if it's a good law, but it is my conscientious and firm belief, and I have made a good deal of a study of that particular subject.

MR. STEVENS: Why does that apply advantageously to a manufacturing concern and not to the farmer?

MR. JACKSON: You gentlemen of the farms have a reputation for asking the most—I was going to say impertinent questions that can be conjured up. Again I call upon you to have the farmer answer, why, if it is good for the railroad, is it not good for the farm?

MR. STEVENS: Just a moment; let me hold you to your original statement. You made the statement that it was an absolutely just act insofar as it applied to manufacturing industries and railroads.

MR. JACKSON: Did I use the word "just?"

MR. STEVENS: You used words to that effect; you are not certain when it's applied to the farmer; now let me ask you why?

MR. STEVENS: I would like to have an answer.

SECRETARY CRITCHFIELD: It seems to me that is not a very hard question. There is a great deal more care involved in keeping machinery in proper condition so that those operating it shall not be hurt, than in keeping a team of horses in proper condition,—I have no experience with mules. If I employ a man on my farm and set him to work with a team that is vicious and bad, I know that if I don't warn him and tell him how he can handle that team, that I ought to pay for any injury that comes to him from that team; but on the other hand, if I put in his hands a team of horses, one of them accustomed to work on the near side and the other on the off side, and he gets them hitched wrong and puts the one that has been worked with a single line on the off side and I have told him how that team is to be worked, I ought not to pay him for any injury that is sustained.

MR. STEVENS: Under exactly the same conditions, why ought a manufacturer to pay?

SECRETARY CRITCHFIELD: Manufacturers don't run their machines with horses.

MR. STEVENS: They do quite often.

SECRETARY CRITCHFIELD: But in the operation of their works, they get power of another kind, it is not horse power. Their machines are run by steam and by water and they must be safeguarded.

MR. STEVENS: But they do use horses.

SECRETARY CRITCHFIELD: Oh, yes.

MR. STEVENS: And if a man was hurt, they would be liable just the same as the farmer.

SECRETARY CRITCHFIELD: I doubt very much whether our courts will ever sustain a law that will make a man liable for an accident that occurs when the party who sustains the injury is himself to blame and has been guilty of negligence.

MR. JACKSON: I will have to say this: I don't want to be quoted by the gentlemen over at the table as in any way saying there is a distinction. I said, if you as farmers feel that it does not apply, that is, the Compensation Law, as a just measure, to you, don't put yourselves in the way of preventing a proper, humane compensation law. I said "humane"; I didn't use the word this gentleman accused me of using; don't put yourselves in the way of such a law in the matter of industries employing large numbers of men under the same rule.

SECRETARY CRITCHFIELD: Here is the trouble; whenever we pass a law that will make provisions for one class that are not made for the other class, then we are guilty of discrimination and the law becomes inoperative under our Constitution.

MR. LOHR: May I have a word in regard to this matter? I have given some time and attention during this last year to a careful study of the Employers' Liability Act. Being a farmer myself, I can see how it can work a great hardship to the farmer and be of considerable benefit to the manufacturing class of people. There is a vast difference, as I understand it, between the farmer and the manufacturer, when it comes to the operation of the Employers' Liability Act. In the first place, the farmer has a capital that is much less, to begin with, than the capital of the manufacturer. If an employee of the manufacturer were injured at some time during his term of employment, that would not amount to very much in the financial affairs of the employer; but if one employee of a farmer were to be injured or killed, that would seriously affect his working capital; so I can readily see that there is a vast difference. Now I understand how a railroad company can have no better plan of settling their cases than by the proper operation of an Employers' Liability Act, because the employees, when they are injured or if they are killed, their families often go into court and when these cases are carried to court, great sums are frequently allowed, while, if the Employers' Liability Act were in force, the amount is specified in that Act and a settlement can be quickly made.

On the other hand, as I said before, the farmer is in entirely different circumstances; his capital is limited and right here is the other distinction; in many cases, the farmer works side by side with his employee, is subject to the same risks and the same dangers, and for that reason it is not fair to have the one partly insured, while the other is not insured. If I go out with my employee to labor in the fields, subject to the same risk he is, if anything should occur that we should both be killed or injured, according to the Employers' Liability Act, which was introduced in the last Legislature, of which I was a member, and to which act I paid particular attention, if, as I say, both should be killed, the likelihood is that the property of the farmer would be taken to pay the liability; in other words, the widow of the employee would step into the place of the widow of the employer, and the result would be that the conditions of those families would just change places; there's no insurance for the farmer, there's no means by which he can recover, his limited capital is all taken to pay the damages caused by the accident in which he ran the same risk as his employee did, so I can see that there is a great difference between the workings of this act when put to the practical application on the farm or in the factory.

MR. STEVENS: May I ask one more question, please? I am not here to criticise anything, I have no idea to criticise, but I just want to ask a question. There are a great many farmers in the State of Pennsylvania whose total capital far exceeds that of many manufacturing concern of equal capital; why should the manufacturing concern be obliged to submit to the rulings of this law and the farmer not?

MR. LOHR: I am speaking of the average capital of the farmer in comparison with the average capital of the manufacturing concern. Now, I will admit that there are many manufacturing concerns that have a capital that is probably less than that of many farmers, but the gentleman has not overcome the other arguments that I was speaking of, where the farmer assumes the same risk as the employee, employer and employee assume the same risk and work side by side. He has not answered that particular question. I understand, of course, that if this law is ever put into effect, that we farmers will be put under the same obligations as the manufacturers are, because if we were not, it would be class legislation, and class legislation is prohibited by the Constitution, so that in the near future we can all expect this, and I think probably by the next Legislature an Employers' Liability Act will be written upon the statute books of this Commonwealth, and you and I and all of us who employ men will be bound by the provisions of that act. I expect to see that.

Now, in order to protect ourselves against that, it will be necessary for us to work out some system of insurance, so that we will be able to meet this demand if it should come upon us, if we should have bad luck, as I might say, with our employees, so that we will not be bankrupt. There are many farmers in Pennsylvania whose capital does not exceed the value placed upon the life of one single employee. A man going out and buying a farm, having a capital of two or three thousand dollars, if he hires a man to help him, we will say, cut logs to build a house on that farm, he goes out into the woods with him, and by some accident a tree falls on the laborer and on the employer both and they are both killed, as I said before, what would be the result? The employer's two thousand dollars would go to the widow of the employee, and the same thing would be the case in the case of a manufacturer, as this gentleman says, there can be no discrimination along that line, yet, as a rule, the farmer has a smaller capital to begin with than the manufacturer.

MR. JACKSON: Wouldn't he pay a very much smaller insurance because he has fewer employees?

MR. LOHR: I think that is the only proper solution, and we farmers must expect, if this bill becomes a law, we must expect to insure our help if we mean to be on the safe side.

MR. McCASKEY: May I offer a tribute to this Board? I am from Lancaster county and I would like to offer it as a Granger from that county. This meeting has been an eye-opener for me. I had no conception of the importance of the work this Board was doing, and when I came up this morning it was just through the courtesy of your Secretary, merely to offer Lancaster county's simple remedy, which the Governor asked for yesterday, and we folks in Lancaster read the newspapers, and this morning, as one of the representatives of Lancaster county, I came up here to offer our remedy and had intended to go back immediately after that short talk, but this meeting has so interested me and has opened my eyes to such an extent that I would like to make this tribute. I think it is a wonderful thing. Why, to just get the scope of what Mr. Martin has spoken about the institutes; on less than three hundred thousand dollars, we have taught 2,500,000 farmers in the State of Pennsylvania. I had no idea we had such a proposition in the State. and yet I have been living here for quite a while, and to have a lady like Mrs. Foulke get up and tell us about the practical, scientific end of housekeeping and how to look after drainage on the farm, and about efforts to get running water and bathtubs and get a little heating plant in the farm house, so that you don't freeze at night—those are things I don' believe the average Pennsylvanian knows about at all, and to hear Prof. Surface make the announcement that tomorrow morning anybody can go and look through the microscope and find out all about the scales and what not—why, we think we are up and doing down in Lancaster and I guess most of them are except myself, and I'm sure I was a back number.

SECRETARY CRITCHFIELD: Well, Mr. Herr is up and doing.

MR. McCASKEY: Yes, siree. There's just one thing I think that series of resolutions today was just a little bit weak, and I would feel that it has not quite accomplished our purpose if we just let them go through as they are. I believe that because our agricultural bureau, the Department here, has gone out and reached out to aid the farmer through the means of these farming institutes and through Mrs. Foulke and the various other departments and bureaus, and as Prof. Surface's Department has done likewise, the farmer gets to trust you people. Now, the farmers will not trust the Highway people; we might as well call this thing right down on dead rock bottom; a spade is a spade; the farmers fought this road bond issue because they didn't like the idea of the Highway Department getting away with the money.

Now, we don't want to get a misconception of this proposition, but down in my own township, out of 270 votes, there were 14 for the bond issue and 256 against the bond issue. Now, practically the same relative proportion existed in Lancaster county. We are not sore down there, but we just feel that the Highway Department has not come out and opened up their hearts to us and said, "Gentlemen, here we are, we are willing to cut out having a road convention in a nice, warm court house, in a dry place when it's raining outside, and the farmers are trying to buck through a lot of seepy spots where their horses are up to their knees, and we are willing to come down to you in the biggest rainstorm you have and have our highway engineers, etc., get out on your road, put their gum boots on, if necessary, put overalls on, and show you in a practical way. We will have our road convention on the worst road you will put us up against." If the State Highway Department would do that, gracious alive, our farmers would welcome them to their arms just as they have Prof. Martin's Institute Bureau, and I would like, here, on my own responsibility, to have everybody who favors anything that I suggested this morning, relative to our State Highway Department Bureau going out to the townships and holding these conventions in a practical way and adopting a one-mile section of roadway to be dragged by a patrolman in each of our 67 counties. It can be done under the present existing laws and it won't cost a cent, it won't cost anything to make friends if you go about it right, and that's all we need; the State of Pennsylvania is not on friendly terms with our Highway Department. If there's anybody in this audience who feels that that suggestion I made this morning is good and sound and ought to be put across by this State Agrictultural Board, I would like them to raise their hands. I, for one, believe in it. Will anybody else back me up? Put your hands up high, gentlemen and lady; am I in the majority or the minority? Come out; don't hesitate. I believe you want to get good roads. I would like to know whether it is the consensus of opinion of this organization to favor that idea or not?

MR. BLYHOLDER: What are we voting on?

SECRETARY CRITCHFIELD: Mr. Chairman, I don't think it is proper for us to take a vote when there is no question before the house. I hope the gentleman will not press that matter.

MR. BLYHOLDER:I would like to announce now to the members of the Board that if they have any resolutions, anything whatever to offer to the Legislative Committee, I hope they will do it very shortly. We have received nothing at all yet. The committee which existed during the last year have just gone out of office and I don't know whether you expect a report from the new committee or not. If you do, pass your wants to the committee at once, this evening. We are right here now at this end of the hall.

The CHAIRMAN: Is the Memorial Committee ready to report?

MR. JOEL A. HERR: I guess so. We have made inquiry as to the mortality among members of the Board during the past year and have learned of but one death, the Hon. William B. Powell, of Shadeland; the older members of the Board will remember him. We have drawn up the following resolution:

### REPORT OF MEMORIAL COMMITTEE

> *Whereas,* We have learned with deep regret that during the past year death has removed from among us an ex-member of this Board in the person of Wm. Beatty Powell, of Shadeland, Crawford county, Pa., we beg leave to offer the following testimonial to his memory:
>
> Wm. B. Powell was a native of Crawford county, Pa., born in 1839, and lived all his life in that county. He died March 30, 1913, in his 74th year. He early in life began the business of farming, specializing in stock raising. He was a member of the firm of Powell Bros., perhaps the foremost and most extensive stock breeders in this State. Mr. Powell was a man of fine scholarly at-

tainments, a fluent speaker, a poet, an inventor, and a dignified, refined and noble specimen of American manhood. He was a man of great social qualities, as was shown by his large list of personal friends. He was a student of nature and was constantly developing something new and useful. He was honorable, upright and progressive in his work, a prince of good fellows socially and of the highest character. He became a member of this Board in 1887 by appointment of the Governor and served four terms of three years each. The records of the Board are an enduring monument to his memory.

We hereby resolve that we lament his death, will revere his memory and emulate his good deeds.

*Resolved,* That a copy of these testimonials be sent to his friends; also a copy be inscribed in the minutes of this Board.

MATTHEW RODGERS,
J. A. HERR,
Committee.

SECRETARY CRITCHFIELD: I rise to second the resolution, and in doing so I want to bear testimony to the truth of every utterance that is contained in this memorial address and resolution. Mr. Powell was a gentleman in his instincts and manners. A truer friend to those with whom he was associated, I think I never had the privilege of knowing, and one of the special things for which I admired Mr. Powell was the tenderness that he always manifested in speaking of his aged mother, who shared his home with him while she lived, during the entire period of her widowhood. I heartily second the resolution, therefore, and the remarks that are associated with it.

The CHAIRMAN: Does any other member of the Board wish to make any remarks?

MR. HUTCHISON: I came upon the Board some twenty years ago—it seems but a short time. Among the distinguished men, the men who were leading the thought of this State in agriculture, especially along the line of breeding fine stock and selling it to our farmers, was Mr. Powell. What a magnificent looking man he was. I can see his face tonight, those fine, flowing whiskers, his Chesterfield look, and how he would clasp us by the hand and have a kind word to say on all occasions, and when the good Governor would invite us down to the mansion and Mr. Powell would appear in evening dress, oh how he delighted to be with people, associate with them. He seemed to be the center of society, seemed to be the center of cheer of our people, and it is sad tonight to think that he has been called away. I heard men testify to his hospitality in his home, men in the common walks of life who would go there to look for stock, how he would meet them at the depot with his fine turnout, take them all over his grounds, show them the fine stock and treat them just as kind as he could, whether they bought stock or did not. That was the reputation he had up in Crawford county, that was the reputation he had all over the country. But time goes on and we have to record tonight that he is departed. We believe that he is in a country where he is united with his friends, and those he associated with her on this Board, in this State, are glad to second this resolution and hope that some heart may be cheered by the words that we have spoken here tonight in remembrance of our good brother.

On motion of Mr. Fenstermaker, the resolution was then adopted by a rising vote, after which the Board adjourned until January 30, 9.30 A. M.

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January 30, 1914, 9.30 A. M.

Vice-President George in the Chair.

The CHAIRMAN: The meeting will please come to order. The first thing on the program this morning is the report of the Specialist on Forests and Forestry, Mr. George H. Wirt, of the Department of Forestry.

MR. WIRT: Mr. Chairman and Gentlemen: Just the other day, a person who has been interested in forestry work for years and years, in talking with some of our foresters, spoke of some of the fires he had had in his forest, and there's a man who understood the value of forests and the destruction wrought by forest fires, yet the remark he made with reference to them was, "My, they must have been beautiful." Now, if we may expect such a statement from a man who has been interested in forestry work from a propaganda standpoint, we can hardly expect anything else from people who have not made a specific study of the subject, and yet that is just the sentiment we find all over the State. They never stop to think of the possibility of loss of life, directly or indirectly, which may result from that small forest fire, not to say anything of the untold loss in dollars that will result.

Mr. Wirt then presented the following report:

## REPORT ON THE ACTIVITIES OF THE DEPARTMENT OF FORESTRY FOR 1913

By GEORGE H. WIRT, *Harrisburg, Pa.*

The work of the Department of Forestry is developed along two lines, viz., that in relation to the management of the State Forest holdings and that in relation to the forests of the State at large.

During the year 1913 there were added to the State Forests 11,776 acres, bringing the total acreage in possession of the State, on January 1, 1914, up to 991,872 acres. There are under contract for purchase a sufficient number of acres to bring this total to something over one million acres.

There are now in the employ of the State under the direction of the Department of Forestry, 56 trained foresters, who are endeavoring to protect, manage, and develop this vast extent of forest land. In addition to the foresters, there are in the employ of the State 90 rangers, whose principal duties are to aid the directors in protective measures and help in the development of roads, in planting operations and general improvement schemes.

During 1913 there were 1,700 miles of roads, trails, and fire lanes worked upon within the State Forests. One hundred miles of telephone line were built by the Department to aid principally in the protection of forests from fire, and at the same time to facilitate the general business of the foresters. Fifteen observation towers were newly established, and with what have already been in use in past years, the State Forests are gradually becoming well dotted with observation towers, from which rangers may quickly detect forest fires. By means of rapid communication with headquarters it is now possible to get men on the ground and extinguish the fires before they reach large size. Every one of these stations ought to be connected with headquarters by a telephone line and to have other necessary equipment. There is a great deal of work along this line which is still to be done, both on the State Forests and upon the forests at large within the State.

Notwithstanding the fact that the spring of 1913 was an unusually bad season for forest fires, the foresters report having had 150 fires, burning over an average of only 52,000 acres, which makes a very low percentage for the region covered, but which is still too high. For it must be understood that the foresters observe and extinguish fires on thousands of acres adjoining State Forests. The above statement does not include the number of fires which occurred outside of State land.

As another phase of the protective measures, and at the same time to properly utilize and develop the State Forests the foresters have carried on what is known as improvement outings; that is, where it has been possible to find a market for certain defective material it has been removed. As a direct result of the sale of such material, including also the returns from certain minerals which have been sold from the State Forests, the Department has turned into the State Treasury during 1913, $13,101, making the total receipts from State Forests up to January 1, 1914, over $76,000. In several instances the receipts from this year's improvement cuttings on a per acre basis, have netted the State more than was paid for the land and timber when they came into the possession of the State.

It is well to call attention to the fact that 80 per cent. of the receipts from State Forests are placed in the Pennsylvania school fund, and as such are devoted to the educational activities of the State.

Owing to the fact that there are still some people who do not understand the idea of the preservation of forests and the purposes for which the State Forests were obtained, I desire to go more into detail upon his proposition. A recent statement made by a judge on his bench brings forcibly to our attention the fact that even in official circles there is still considerable misunderstanding in this matter.

## THE REMOVAL OF TIMBER FROM STATE FORESTS

Pennsylvania is second to none of the States in her long and consistent legal consideration of the value and importance of trees and forests. William Penn requested that the colonists "leave one acre of trees for every five acres cleared" so that the future timber demands of the colony might be assured. The provincial government recognized its duty to prevent the needless burning of forests because of injury to the soil as well as destruction of the timber and of the infant improvements of the Province. It placed a heavy fine upon offenders, and made them liable to civil suit. The laws of the State government, too, have sought repeatedly to prevent unnecessary forest destruction, and to make more certain a continuous future crop of trees.

Between 1860 and 1880, forestry, a recognized science and a well developed business abroad, was being much discussed in America as something new. As early as 1877 at the first meeting of the Pennsylvania State Board of Agriculture, it was stated that "there can be no doubt that timberlands belonging to a State might be managed with a view of maintaining them for the growth of wood" so as to provide against future wants. At that time there were about 2,340,000 acres of unpatented land within the State. The State Board of Agriculture did great service in keeping the subject of forest protection before the people, and throughout all of its papers and discussions, runs the idea that forest protection is necessary to maintain future demands for wood as well as to continue all the beneficial indirect effects of forests.

In 1886 some of the men and women of Pennsylvania who were studying the subject of forestry organized the Pennsylvania Forestry Association for the purpose of uniting in the work and of spreading the propaganda for "forest preservation" throughout the State.

The ideas which those interested in forestry within the State have understood to be essential, have never been expressed more clearly than as given in the first issue of Forest Leaves, July, 1886.

"Forest Leaves is not intended to represent merely the theory of forestal culture or management; but it is expected to be the organ of an association, the object of which is to collect and distribute information upon practical methods to be pursued, and commercial as well as sanitary results to be obtained by augmenting the proportion of wooded area in the State.

"The prevailing sentiment of those who organized the present movement recognizes that *trees like grain grow for man's benefit, which when ripe should be cut and put to use.* It however condemns the useless destruction of forests with the same emphasis that it would be the waste of growing grain, and would encourage an equal interest in each, believing that a due proportion of forest is as essential to the public weal as a sufficiency of farm land. It does not seek to reduce the amount of tilled land, but is anxious to protect the farms by maintaining a climatic equilibrium which is only possible where forests are retained in proper proportions. *Recognizing the large industrial interests dependent upon the forests of Pennsylvania, it would by reforestation of waste lands and preventing needless destruction, make these industries permanent.*

"*It would while considering the present, look to the future*, and, by concert of action, secure legislative enactments to prevent useless waste of our already reduced forests and encourage the propagation of new growths, *which, while benefitting the present generation, will maintain Pennsylvania a goodly heritage for those who follow us.*"

In the same issue the following statement is found: "Unless tree-planting is implied, there is very little meaning in the phrase, 'Preservation of the forests,' for it is idle to suppose that any considerable portion of our timber will be spared the woodman's axe where the economic wants of the country demand its use. To spare the woods, would be equivalent to applying a brake to the wheels of industry and general progress."

In the issue of April, 1888, it was stated that the Pennsylvania Forestry Association seeks to restrict the abuse, and not to interfere with the proper use, of our forest growth.

The members of the Forestry Association and allied organizations were instrumental in having the Legislature of 1893 pass an act providing for the appointment of a Forestry Commission to study the conditions and needs of the State with reference to its forests. Among other things the act specifies that the Commission shall report "What measures if any are being taken to secure a supply of timber for the future. It shall further be the duty of the said Commission to suggest such measures in this connection as have been found of practical service elsewhere in maintaining a proper timber supply."

"The said Commission shall also ascertain what wild lands, if any, now belong to the Commonwealth, their extent, character, and location, and report the same together with a statement of what part or parts of such lands would be suitable for a State Forest Reserve, and further, should the lands belonging to the Commonwealth be insufficient for such purpose, then to ascertain and report what other suitable lands there may be within the State, their extent, character and value."

There can be no question as to the meaning and the purpose of a State Forest Reserve in the minds of those who first proposed the idea to the Legislature. From statements made upon the floor of the House and recorded in the Legislative Journal, there can be no question as to the understanding of the proposition by the Assembly and, from statements made by the several Governors who supported the movement and signed the bills which relate to State Forest Reserves, it is reasonable to conclude that they, too, had an opinion similar to that held by propagandists and legislators.

This common understanding among the people of Pennsylvania is given by the botanist member of the Forestry Commission of 1893 in his report to the Legislature of 1895 as follows:

"The question is thus narrowed down to one of acquisition of suitable lands, and naturally the first inquiry is, do any such lands exist within the limits of our State? This, of course, depends upon what the prospective functions of the reservations are to be in relation to the State. We should expect them

"First, to be capable of producing some crop which would compensate the State for cost of purchase and of maintenance.

"Second, that they could be kept under such control as would lead to diminishing the frequency and severity of freshets on the one hand, and on the other, that they should aid in maintaining an even flow of water to foster our industries and feed our springs and streams.

"The third purpose given was that they should serve as sanitariums and outing grounds for the people, and the fourth, that they should serve as collecting grounds for water supplies for towns and cities and for the generation of electrical power.

"With this long historical background for the protection of forests "to restore the lumbering industry" it is not surprising to find written into the law of 1901 creating the present Department of Forestry these words: "and whenever it shall appear that the welfare of the Commonwealth, with reference to reforestation and the betterment of State Reservations, will be advanced by selling or disposing of any of the timber on forestry lands, the Commission is hereby empowered to sell such timber on terms most advantageous to the State."

Although the real conservation policy of "wise use" has frequently been attacked in Pennsylvania, and attempts have been made to have natural resources locked up, such an effort has never received support, largely due to the fact that the State Forests have been administered for the benefit of the people and not for any one's personal benefit. Members of all political parties have supported the work of the Department, and what antagonism has arisen has been because of the fact that in certain instances politics were ignored and good business methods followed in the carrying out of Department work.

We have an unfortunate example of natural resources locked up in Forest Preserves in our neighbor State, New York. The work there started right, but, because of mismanagement the people went to the extreme in the wrong direction until it can be said now, that forestry is common in New York everywhere but in the forests. A recent trespass case may be cited as the method in vogue there. A large quantity of timber on State land had been felled by a company operating on an adjoining tract. The trespass was discovered before the logs were removed. The company was fined. The logs are still rotting upon the ground because the State Constitution prohibits the removal of any timber from State Forest Preserves. The State could have sold the logs and received several thousands of dollars of profit from them. Still the people of New York need more timber than they can get at home and have to pay continually increasing prices because of increasing scarcity of the commodity. Thousands of dollars' worth of fire-killed and mature timber is going to waste. Industries need the wood, people need the labor, and the forests, themselves, call for its removal. Pennsylvania does not want her State Forests to be a detriment to her people.

Since 1902 there have been constantly increasing amounts of material removed from our State Forests resulting in immediate financial profit to the Commonwealth and in an improved condition of the forests from which it was taken. The methods of removal have varied somewhat, but in all cases, it has been under the direction of a forester. At first two methods were common. Dead stuff was sold on the stump; live trees were cut by men employed by the Department and sold to the best advantage. Cordwood, poles, posts and ties were the principal products. Later a saw mill was employed to cut larger trees into lumber, the Department employees felling the trees and cutting them into lengths. Later it was found that where improved cuttings were being made from time to time it was impractical to cut everything into cord wood or to get a saw mill man to contract for cutting a few logs at a time. The Department then purchased for the South Mountain forest a saw mill outfit, including a shingle mill and a lath mill with which a considerable profit has been obtained from the removal of stuff otherwise unprofitable.

As other forests have been developed it has been found that in most cases under present conditions it is the best policy to have the timber removed under contract, the contractor paying for the material at stumpage rates and agreeing to follow certain regulations to cutting and removal. In many cases, however, the trees to be removed are scattered, the quantity to be removed in one place is small and lumbermen do not want to contract for such conditions at reasonable figures. They are not used to such conditions and usually figure the risk, expense, and profit higher than is necessary. Under such conditions it is evident that the work must be done by the Department. The material for manufacture will have to be stored until there is obtained a quantity sufficient to induce a saw mill man to set up his outfit.

At the end of 1913 the Department has received a total of over $76,000 from the sale of products from State Forests. During 1913 alone over $13,000 were received. Eighty per cent. of this fund goes to the State School Fund.

The Department of Forestry is bound by precedent, by law, and by common sense, to continue its policy of harvesting dead, defective and mature timber from the State Forests, and in time the revenue from this source will be yielding the Commonwealth a high rate of interests on its investment in forestry. The forests kept well stocked with thrifty trees and well managed for the production of timber to be used will furnish all the other economic uses for which trees or forests might be grown, namely, protection and regulation of water supply, amelioration of moisture and climatic conditions, beneficial effects upon industries, labor and the general welfare of the Commonwealth. All these things will come in addition to the direct financial profit and without any additional investment.

There were planted upon State Forests during 1913 3,000,000 seedlings, bringing the total number planted to date up to 11,000,000, covering an area of 5,500 acres.

From the time of Governor Stone, the idea of making State Forests recreation grounds for the people of the State has received more and more recognition, and in accordance with this idea the policy of the Department has been and always will be to open these reserves for every possible use the people of the State can make of them, as long as such use does not interfere with certain other purposes for which the forests must necessarily be held, viz., the protection of water supply from contamination, and of course, the growing of the forests themselves, which in fact is what brings about all of the economic uses of the forests.

During the year 1913 an effort was made by our foresters to get as many as possible of the school children in their neighborhood out into the forests and give them a day's outing and instruction in nature study. A number of very interesting questions came up in this connection, but we do not have time to deal with them now.

During the year 811 camping permits were issued granting permits to over 4,500 people to stay upon State lands for a period of anywhere from two days to three weeks. In addition to this there were thousands of people who hunted, fished, and spent days of pleasure upon the State Forests of whom we have no definite record.

Owing to the establishment of game refuges on some of our larger forests, the game of the State is increasing. Every year many of the streams within the State land are restocked with trout.

One step in advance with reference to the use of the State Forests has been accomplishel by reason of a recent act of the Legislature permitting the Department of Forestry to lease small camp sites for a period not to exceed ten years, to persons who may care to place thereon a more or less permanent shelter. It is to be hoped that as a result of this move the people of the State will begin to appreciate the beauty of her forests and streams both in summer and in winter, and in time Pennsylvania mountains will be as famous for their scenery and for the pleasure which can be obtained in them, as those of any other State or country.

The work of the Department with the forests of the State at large is now devoted principally to two main propositions, viz., their protection from fire and the matter of assistance to private individuals in caring for their woodland. The forest fire problem is not yet being solved satisfactorily in this State because of the fact that the people of the State themselves do not as yet co-operate heartily with the Department. The problem cannot be solved by the forest land owners themselves nor by the State itself, but only by a satisfactory co-operation between them. We shall always have forest fires; but when a systematic effort is made to detect and stop the fires before they reach great size, then we may be assured of reasonable protection. A number of people try to blame the forest fire problem upon the railroads. We find that the largest number of forest fires are directly attributable to carelessness of all classes of people, and the large fires are almost entirely due to a matter of indifference. Timberland owners do not realize the value of their timber, especially if it happens to be young growth, and very few people realize the damage that is done by forest fires.

In the recent Legislature, a bill was introduced providing for satisfactory co-operation between the Department of Forestry and private timber owners, provided the owners themselves would form an organization and take some steps to protect their own property. The idea was that when such organizations were completed, the Department of Forestry should detail for such organizations certain patrolmen, and expend for patrol purposes an amount of money equal to the amount of money which would be raised by the organization itself for all other protective purposes. There are certain things which the State apparently dare not do with its money, as for example, open up roads and trails upon private lands, extend telephone systems, establish lookout towers, print and distribute circulars and posters to a sufficient extent to flood each community with facts relative to the subject of forest fires. All of these things a local protective association might do. If their efforts can be supplemented by patrolmen, the forest fire problem would be almost solved. Unfortunately, the legislators could not see things this way and passed the bill simply allowing the Department to expend for patrol purposes an amount of money equal to that amount raised by the association for the same purpose. The result is that the co-operation supplement is not as satisfactory to private timber owners as the old fire warden law.

In this connection it may be well to state, that the Legislature of Pennsylvania appropriates $25,000 a year for the protection of at least eight million acres of forest land, which at a minimum value for the present merchantable timber standing thereon is worth 150 million dollars. Is it any wonder that the Department of Forestry cannot assure the people of the State a better insurance against fire loss?

The Department of Forestry has extended during the past year its efforts in the matter of assistance to private individuals. All of its foresters are at their service when the work upon the State Forests does not demand their immediate attention. The Forest Inspector made only 21 inspections during the year; but it is a notorious fact that notwithstanding the fact that the farmers and timberland owners know that the Department of Forestry is at their service, comparatively few have called for assistance.

During the year approximately 50,000 seedlings were distributed to private individuals from State nurseries simply for the cost of raising the seedlings, and in most instances supervision is furnished during the planting operations.

The most important step dealing with the forests at large which has been taken during the year and during recent times, was the passage of what are known as the auxilliary forest preserve acts by the last Legislature. Under the old general property acts the forests of an individual have been taxed in a manner which practically amounts to their confiscation by the township. The result has been in many cases that where the owner has stopped long enough to think about his forest land from a financial standpoint, the forests have been removed, and until the last few years millions of acres of forest land have been available at tax sales because the owners did not care to pay taxes upon them after the best growth had been removed. By reason of the recent acts young timber land and waste land which will be planted to forest trees may be placed into the auxilliary forest reserve class, and once in this class by order of the Department of Forestry, the assessment must be reduced to not more than $1.00 an acre. For all such lands the State pays to the townships four cents (4c) an acre, which in the majority of cases will give the township an amount of money sufficient to carry on their operations until the timber upon the land is ready for cutting. At that time the owner will pay to the county one-tenth of the stumpage value of the material removed. The proposition is simply this: During the time that the timber is growing the timber owner, which means every farmer who has a woodlot from a half acre in extent to any number of acres, may pay a low tax. When it is cut and he receives a financial return, he is then able to pay easily the deferred tax. It remains to be seen how the farmers of the State will take advantage of these acts.

Another important step which will be of advantage to woodland owners of the State, was another act of the last Legislature permitting the appointment of district foresters. Such foresters are to be appointed by the Commissioner of Forestry when the demands for assistance from the county or the necessity of forestry work in the county demands his appointment. The duties of this district forester will be to superintend the activities of the local fire wardens, to see that they are properly distributed and perform their duties rightly; to be of assistance to all the farmers of the county in the matter of advising them and helping them in the planting of waste land to forest trees and the proper care of their wood lots and forests; and at the same time to do whatever can be done to educate the people of the country to the importance of forests and their care. In other words, the district forester will be to the farmers in respect to their forests just what the local county farm expert now is with reference to agricultural crops.

I would say that upon the desk you will find copies of those auxiliary forest reserve laws, together with some circulars dealing with them and some blank applications, in case any of you want to take them along and consider them and make application to the Department for having your land placed in that class.

The CHAIRMAN: This report is ordered filed with the proceedings of the meeting. The next is an address from the Attorney General's Department, "The Farmer and Legislation," by Hon. Wm. M. Hargest.

MR. HARGEST: Mr. Chairman and Members of the State Board of Agriculture: After you have listened intently for two days to a discussion of the various phases of governmental endeavor of this Commonwealth, I am rather fearful of the task imposed upon me to interest you at this time; for while the real lawyer loves the law and its discussion, yet it is sometimes difficult to awaken that admiration in the layman.

Mr. Hargest then presented the following paper:

## THE FARMER AND LEGISLATION

By HON. W. M. HARGEST, *Harrisburg, Pa.*

I have been requested to address this body upon the subject of "The Farmer and Legislation." It is a subject too comprehensive to be adequately treated within the confines of a single address, for from the very earliest ages agriculture has been the subject of legislation, and when it is remembered that all sustenance comes from the soil, we need no other explanation of the fact that the laws, at least, of the Anglo-Saxon people, have provided for the protection of the farmer, and the development of his industry.

Investigation shows that many of the same problems which demand the attention of the farmer today have disturbed him for centuries, and if you are as entertained by a brief reference to some of the interesting circumstances, disclosed in the laws relating to farming as I have been in investigating the subject, this address will, perhaps, not be in vain.

I find that as early as the year 1488, there was a statute passed, in England, which complained that the farmers have allowed their farms and houses to become out of repair, and required that all houses let for farms should be kept up or a forfeiture of one-half of the profits should go to the King.

In these days of discussion, agitation, and legislation against trusts, it is interesting to note, that as early as 1534 there was an anti-trust act passed in England, for the protection of the farmer of modest means, and it was not only an anti-trust law, but it complained of the high cost of living. It said:

> "Some farmers have 24,000 sheep; some 20,000; some 6,000; some 4,000 and some more or less, and yet the price of wool has nearly doubled, and sheep had come into a few persons' hands."

And in order to prevent the high cost of living, another statute was passed as early as 1597, in England, which provided that land which had been made arable should not be again converted into pasture.

As early as the year 1552, perhaps the first English statute against forestalling was passed. It forbade the coming of any person to market to bargain for the buying or selling of any merchandise or victuals, "unless the same be in the market ready to be sold or purchased," and it forbade the dissuasion of any person coming to market or bringing anything to market. It prohibited a person from selling what he had bought in the market within four miles of the same market. It prohibited the selling of cattle within five weeks after they had been bought, and had other similar provisions intending to prevent what was called forestalling and regrating.

Forestalling was the subject of a statute of the Province of Pennsylvania as early as January 2, 1778 (IX Stat. at large 177), which was entitled, "An act to prevent forestalling and regrating, and to encourage fair dealing."

During the sixteenth century and just before the settlement of the American colonies, there were laws in England enacted against tramps and vagabonds, regulating the wages of labor, the prices of provisions, and relating to the exportation and importation of corn. In the year 1662 there was passed the first statute, in England, providing for the levying of tolls on turnpikes.

So that our forefathers, who came to settle and develop the American colonies, came with some knowledge of legislation in the interest of the farmer, and in no colony on American soil was the interest of agriculture more tenderly fostered by legislation than the colony established by William Penn. Legislation looking to the happiness and prosperity of those engaged in agricultural pursuits was soon started.

One of the very first statutes, passed November 27, 1700 (XI Stat. at Large 12), provided for the penalty of imprisonment for life, and the forfeiture of all the offender's estate to the party suffering, for firing or setting fire to a house, outhouse, barn or stable, and providing a year's imprisonment and four fold satisfaction to the sufferer for firing a man's stacks or ricks of corn, hay, wood or fence, and if offender was unable to make satisfaction he or she was to be sold for the benefit of the party suffering.

On the same day, November 27, 1700 (II Stat. at Large, 70), there was passed the first act regulating the maintenance of fences. The salient features of which remain the law today. It provided:

> "That all corn fields and grounds kept for inclosures * * * shall be well fenced with fences at least five feet high, of sufficient rail or logs, and close at the bottom, and whosoever not having their grounds inclosed with sufficient fences as aforesaid, shall hurt, kill or do damage to any horse, kine, sheep, hogs, or goats, of any other person, by hunting or driving them out of or from the said grounds, shall be liable to make good all damages sustained thereby to the owner of the said cattle."

This is the first act upon what has since been a fruitful topic of legislation and discussion among farmers.

The second section of this act provides for fence viewers and the payment of help the charges of partition fences. Out of this old act of Assembly originated, what are now well known propositions of fence law, as follows:

An occupant is not bound to join in a division fence, and he may set his fence, if he pleases, not on the line of division but on his own land, in which event, however, he must maintain his own fence. If no fence is erected either party may, at his own discretion, erect a partition fence, and when the charge assessed by the fence viewers is paid such partition fence becomes the common property of both owners.

As late as 1894 it was decided that Section 3 of the fence act of March 11, 1842 was substantially a reenactment of the second section of the old act of 1700, and is not repealed by the Act of April 4, 1889, P. L. 27, so that the law as to partition fences adopted in the Colonial times, in 1700, is practically the law of today.

From this old legislation has grown various other phases of fence law. Punishments have been prescribed for maliciously breaking down fences, wire fences have been legalized as proper line fences, and other things, which cannot be noticed within the limitations of this paper, have been provided for.

There was an Act of March 4, 1763 (VI Stat. at Large 261) "concerning cattle, horses and sheep trespassing within this province," and it provided that any person injured by such trespassing "may seize and restrain such" animals, and may retain the same until he shall recover and receive the damages sustained by such trespassing, together with the costs of advertisement, and reasonable charges for keeping, and this act has been the subject of many subsequent amendments from the time of its passage down to the year 1893.

In the very early days there did not seem to be any positive prohibition against swine running at large, but I find that the Act of January 12, 1705 (II Stat. at Large, 93) prohibits swine running at large within fourteen miles of the river Delaware only when they did not have rings in their noses, or yokes about their necks to prevent rooting, and the act provided that swine without such appurtenances might be killed and carried away, their value appraised, one half of the value to go to the owner of the rooted land, and the other half to the proprietary and governor.

Many Acts of Assembly were passed for the protection of the farmer which authorized them to kill destructive birds and animals. The Act of October 28, 1701 (II Stat. at Large 166) is interesting. It provides:

> "It manifestly appears by the innumerable quantities of blackbirds and crows that continually haunt in this province and territories, to the great prejudice, hurt and annoyance of the inhabitants thereof, being destructive to all sorts of corn and grain that is raised therein, so that the people's labor is much destroyed thereby, and that the people may for the future be the better encouraged in their labor and industry, by destroying such birds, thereby to hinder their great increase."

Therefore, all blackbirds are paid for at the rate of "three pence the dozen; and for every crow three pence."

A bounty was provided as early as 1705 (II Stat. at Large, 238) of ten shillings for the killing of any male wolf, and fifteen shillings for female wolf, and this bounty was increased in 1782 (X Stat. at Large, 460) to twenty-five shillings for every grown wolf, and fifteen shillings for every wolf puppy.

One of the matters which a Pennsylvanian may consider with pardonable pride is the fact that the pure food legislation of the state has advanced beyond that of any other state in the Union, and with that legislation the farmer is deeply concerned.

It had a very early beginning. As early as May 12, 1772 (III Stat. at Large, 291) the legislature of the Province of Pennsylvania undertook to regulate the ingredients of ale and beer, but while the statute refers to the unwholesome materials, the regulations were more to promote the business of the farmer than in the interests of purity or for the protection of public health. It recited that:

> "It is found by experience that the using of molasses and other materials in brewing ale and beer doth very much hinder the consumption of malt, and so the raising of barley is thereby discouraged."

Therefore, it is enacted that if any brewer or retailer of beer or ale

> "Make use of any molasses, coarse sugar, or composition or extract of sugar, honey, foreign grains, Guinea pepper, or other liquor, or syrup, boiled up to the consistency of molasses, or any unwholesome materials whatsoever, in the brewing, making or working of any beer or ale."

or if he should receive or take any of these things into his brewhouse he shall forfeit the sum of twenty pounds.

It provides for a penalty against any servant assisting in using such articles.

And this act is also the first act upon the statute books for the licensing of persons authorized to sell intoxicating liquors. It provides that no person "shall be admitted or suffered to keep any common alehouse, inn or tippling house, but such as the justices of the peace of the respective counties .......... shall, in their discretion, judge fit."

And it provides that:

> "None shall be so admitted or licensed before they be bound, with one or more sufficient securities, by recognizance to the governor for the time being, in twenty pounds penalty, with condition, as well against using any unlawful games, as for the using and maintaining of good order and rule."

We have apparently gone through quite an evolution upon this subject. This old Act of Assembly seems to have encouraged the making of ale and beer. The laws of the present day are discouraging such manufacturing.

I find that one of the very first tariff laws, at least in force in Pennsylvania, was passed directly in the interest of the farmer.

On March 29, 1788 (XIII Stat. at Large, 57) an act was passed which recited that:

> "Considerable quantities of foreign malt not the produce or manufacture of this or any other of the United States have been imported into this State, whereby the price hath been so reduced as greatly to discourage the raising of barley, although the soil and climate of this and the neighboring states are well adapted to the producing thereof, and whereas it is expedient to give all due encouragement and preference to the agriculture and manufacturing of this State."

It was then enacted that:

> "There shall be levied, collected and paid to the use of the Commonwealth for every bushel of barley or malt imported into this State not of the growth of the United States, the sum of two shillings and six pence."

Of course no State tariff law could be passed after the adoption of the Constitution of 1789.

I have already referred to the old English statute of 1534 on the high cost of living. This same agitation which we have now concerning the cost of living, and which they seemed to have had in England in 1534, they also had in this province in 1778, for there was passed (IX Stat. at Large 236) "An act for regulating the prices of the several articles herein mentioned for a limited time."

It recites:

> "Whereas, certain persons in this State, instigated by the lust of avarice and devoid of every principle of public virtue and humanity are assiduously endeavoring, by every means of oppression, sharping and extortion, to accumulate enormous gain to themselves, to the great distress of private families in general and especially of the poorer and more dependent part of the community as well as to great injury of the public service."

Therefore, for the suppression of such nefarious practice no person "shall ask, demand, receive or take any greater or higher prices for any or either of the articles herein enumerated and mentioned than the several prices herein set down and limited, to wit: ' For wheat by the bushel, twelve shillings. Merchantable flour by the hundred, thirty-three shillings. Rye by the bushel, ten shillings. Indian corn by the bushel, seven shillings and six pence. Barley by the bushel, ten shillings. Oats and spelts by the bushel, six shillings. Buckwheat by the bushel, five shillings. Whiskey, full proof, by the gallon, nine shillings. Good cider by the barrel, thirty shillings. Good pork by the pound, from nine pence to a shilling, according to its quality. Beef by the pound, from eight pence to one shilling, according to its quality. Firkin butter, tallow and cheese by the pound, one shilling and three pence. Fresh butter by the pound, two shillings," etc.

Apropos of the high cost of living, and also indicating how close identified the law and the lawyer is with the farmer, I call your attention to the fact that a statute of November 27, 1779 (X Stat. at Large 39) provided that:

> "Whereas the fees of the officers of this Commonwealth who are hereafter mentioned as now regulated by law are by the great rise of the prices of the necessaries of life, become very inadequate to their expenses whilst they attend the public business."

it is enacted that the fees of said officers shall be estimated and paid according to the price of good merchantable wheat.

Then follows the provision that the judges, prothonotaries, court officers, attorney general, attorneys at law, as well as juries, witnesses and many others connected with the administration of the laws be required to accept their compensation in wheat.

This retrospect of the old laws of the past, while interesting, is only profitable to the extent that it enables us to understand, and to better provide for the future. There are many live problems which affect the farmer of today, and will continue to affect the farmer of tomorrow, which in large measure must be met and solved by legislation.

One of the large questions which has disturbed the farmer for many years, and is at some extent still disturbing him is the trespassing of animals, to which I have referred, and particularly dogs worrying sheep, and it is often the question with the farmer how far he can go without subjecting himself to liability in protecting his sheep.

By the Act of April 14, 1851 (P. L. 1852, page 711) it is provided:

> "That it shall be lawful for any person or persons to shoot or kill any dog or dogs found or known to be chasing or worrying sheep, or accustomed to do so within this Commonwealth, without liability on the part of such person to pay any damages therefor."
>
> "That from and after the passage of this act, the owner or owners of any dog or dogs shall be liable for all damages done......by any and every such dog or dogs......to be sued for before any court or justice of the peace having jurisdiction of the amount so claimed."

And it has been held that one who shoots a dog, justifying himself under the provisions of this act cannot be convicted of cruelty to animals, and it is not necessary that a dog shall actually be seen worrying sheep. It is enough to see him follow them with hostile interest, and that the owner of the sheep knew of his propensity for worrying sheep.

But the burden of proof is upon the defendant to show that the killing was justified, and the question of whether or not one charged wi h the killing of the dog was justified therein is always for the jury.

The worrying referred to in this act does not imply biting or tearing with the teeth, for if a dog pursues and barks at sheep it is sufficient to protect the owner of the sheep against any liability for killing.

Pennsylvania has always been in the forefront with legislation in the interest of the farmer. She has early passed laws to prevent deception in sale of butter and cheese, and perhaps the very first statute which protected the farmer against the invasion of oleomargarine was passed by the legislature of Pennsylvania in 1885, and it gave rise to the case of Powell vs. Pennsylvania in the Supreme Court of the United States (127 U. S. 678) which has since become one of the most famous cases in American jurisprudence.

The farmer in Pennsylvania is interested in all phases of the pure food laws, but he is interested in none more than in the act of May 21, 1901, providing for the regulation of the manufacture and sale of vinegar. And this act has been the subject of much discussion, and is now passing through the stages of important litigation.

By the Act of 1897, this State prescribed a standard that vinegar should be of not less than four percent. in acidity, with the result that the farmer who made his vinegar from pure apple cider, and who added no acids sometimes had vinegar which did not reach the test of four per cent., and the merchant was often induced to avoid the cider vinegar made by the farmer for fear it did not comply with the law, but in 1901, in the interest of the farmer alone, the legislature amended the Pennsylvania vinegar law so that it did not provide any test or standard of acidity, and now Pennsylvania permits the farmers to use up their surplus of apples by converting them into cider vinegar, and as long as they make vinegar to which no water, drugs or acids have been added, they come entirely within the protection of the law.

The present litigation over this vinegar statute is a contention that the addition of water to vinegar is not a violation of the law. because the great vinegar interests desire to add water to bring the vinegar to a four per cent. acidity. The contention of the Pure Food Department of this state is that the housewife can add water if the vinegar is too sour. I may remark in passing that Pennsylvania changed its law in 1901 by striking out any standard of acidity wholly in the interest of the farmers, although thirty-three or thirty-four other states of the Union required an acidity test for vinegar.

And well may Pennsylvania consider the farming interests of the State when it is remembered that there are 200,000 apple orchards in this Commonwealth.

If time permitted I might recount other instances where this great Commonwealth has endeavored to throw its protecting arm of legislation around the farmer; how it has provided for investigation, experiment and beneficial treatment in the orchards of the Commonwealth, for the eradication of disease from cattle, trees and shrubs; and in the fertilization of its fields, but time will not permit of any such elaboration.

We have our pure milk laws which provide for the proper output of the products of a million dairy cows.

I do not know of any instances where the farmers of Pennsylvania have come to the legislature with a real and substantial grievance which was not considerately received. Sometimes while we do not get the legislation which the most radical of us think we should have, and sometimes get more than the most conservative of us think there is any occasion for, yet considering the whole matter, the Legislature of Pennsylvania generally, has not overlooked the fact that while this great Commonwealth is rich with minerals, and with manufactories, it, nevertheless, has 218,000 farms, and over 300,000 persons actively engaged in agricultural pursuits, who deserve the best legislation to foster and promote their industry. prosperity and happiness which the very best thought and experience of the times can provide.

MR. STOUT: I would like to know how this law about solids in vinegar applies?

MR. HARGEST: Solids in vinegar means only the natural solids that appear there from the apple itself; it does not mean the addition, in my opinion, of any other apple solids, even though they may be apple solids which may be put into the vinegar, although taken from some other place.

MR. STOUT: The reason I asked the question is this; I had 20 or 25 barrels of vinegar a few years ago and took some of it to a vinegar factory in Philadelphia; some was very acid, but they told me they could not accept that cider vinegar, although it was absolutely pure, because it did not contain the solids required by law.

MR. HARGEST: That was before the Act of 1901. That Act took away any standard of acidity or solids. That was while the Act of 1897 was in force, which prescribed not only acidity, but also solids. Since the Act of 1901 was passed, you need not be afraid of your vinegar, either as to acidity or solids, provided you add nothing to the pure apple cider.

MR. STOUT: Here is another little question: I have adjoining fields; there is a little stream passes through that I have bridged with just a flag laid across to walk across. I find it more congenial to erect a bridge to drive across; is it necessary for me to get permission to erect a bridge on my own property?

MR. HARGEST: What kind of a stream is it?

MR. STOUT: Just a little stream.

MR. HARGEST: I know of no such provision. You are referring to what is declared by the State to be a public navigable highway. That word "navigable" refers to streams that cross the State, and many times streams have been declared navigable which, of course, cannot be navigated by anything, not even a rowboat, in some places, but it is only those streams that would affect the question you ask?

MR. STOUT: I would not want to take the risk of making myself liable to a fine without some knowledge, because I did not know whether I was authorized to construct a private bridge there or not.

MR. HARGEST: I suppose there would be no danger in that.

SECRETARY CRITCHFIELD: I want to say that I saw Mr. Hargest and asked him to talk before the Board of of Agriculture and to represent the Attorney General's Department. He said to me, "I don't know of anything I could say to a body of farmers that would be of interest." Oh, what a pleasant thing it is to be surprised. I want to say that, speaking for the Board, we are under an obligation of gratitude to Mr. Hargest for the very important information he has brought to us this morning. And personally, I feel under a very deep debt of gratitude, because what he has said will be published with the proceedings of this meeting and I will be saved the trouble of writing many letters, especially on that fence law question. Oh, if I could have right here before me the pile of letters I have received from farmers all over the State with regard to line fences, asking, "What is the law? We don't understand it," and I have never printed a bulletin or had a bulletin printed on that subject, but now I've got it from headquarters.

Another question that has given us a great deal of trouble in the Department has been the vinegar law. Another pile of letters could be exhibited that have been written to the Department, both the Dairy and Food Commissioner and myself, as to the provisions of that law. Just as was indicated in the paper, men dealing in vinegar, the agents of these manufacturers, will come around and tell the storekeeper and the grocer, "You can't buy that vinegar, you will be in danger of prosecution, it won't meet the requirements of the law." And so there are barrels of vinegar today stored away in the cellars of farmers that have not been put upon the market simply because, like Brother Stout with his bridge, they wanted to be sure they were not transgressing the provisions of the law of the State. We are certainly under very great obligations to Mr. Hargest.

MR. HARGEST: May I say that I think the shoe is entirely on the other foot, and I think the gratitude is mine, because, when our distinguished Secretary of Agriculture came to me, while I don't know what I could say, yet you would be surprised to know how much more I know now than when I first began to examine this subject, and I am very thankful for having had the opportunity to make the examination, and particularly thankful if I have been the means of being of any interest.

MR. HUTCHISON: You referred to the law of 1700, that compelled a man to fence in his cornfield, and then it provides that if he drives out animals and does damage, he could be prosecuted.

MR. HARGEST: No, no, it provides that if he hasn't got that fence and drives out the animals and does them damage, he can be prosecuted.

MR. HUTCHISON: Is that law in force today?

MR. HARGEST: With some modifications, yes. If he hasn't the fence and drives out the animals, he can be prosecuted, but if he has the fence, he can take the animals and hold them.

MR. HUTCHISON: But if his fences are down and the town cows get in his field and he damages any of those cattle, would he be liable?

MR. HARGEST: I am inclined to think so, although that would be only a curbstone opinion.

SECRETARY CRITCHFIELD: Yesterday I got a letter from a farmer in the western part of the State, saying that a dog had killed some of his sheep and he had been advised that he could not kill the dog, even though he saw him in the act of worrying his sheep, because a dog was now recognized as property and a tax was being paid on it. He wanted to know what he could do. Well, I answered and said, "I am not a lawyer, but I think you will be all right if you kill the dog, even though the party may be paying tax for it." Was I right in that?

MR. HARGEST: I think so.

SECRETARY CRITCHFIELD: If this meeting had not been in session, perhaps I would have taken time to look it up, but that is the way I answered.

The CHAIRMAN: The other two numbers on this morning's program have been heard at other sessions; there is one here that was left over on Wednesday afternoon, the address by the Dairy and Food Commissioner, Hon. James Foust, if the gentleman is present, we can hear that report today.

SECRETARY CRITCHFIELD: When Mr. Foust was called for day before yesterday, I stated that he was tied up in the courts. He came to me this morning and told me there was a meeting of a Board, of which he was ex-officio member, and which will be in session this forenoon, and asked, "What shall I do?" I said, "I don't know but what it is better for you to attend your Board meeting." He said, "I will come here if you say so." I said, "If you will simply put in my hands a statement along the lines we expected to get information from you in your remarks, so that I may send it out to the members of the Board, I think that will answer the purpose," so he is going to do that after attending to his other duties. We are all very busy here at the Capitol and have to accommodate each other. If it be your pleasure, I will send a messenger for Mr. Foust; but I think I was right in saying that our ends will be as fully met if he will put in writing a statement of what has been done in his Department since he has had charge of that Department; I think that will serve our interests just as well.

MR. HUTCHISON: I move that the paper by Mr. Foust be received and published with the proceedings.

MR. COWAN: I second the motion.

SECRETARY CRITCHFIELD: I don't want to raise any objection to that motion, but Mr. Foust has no paper. He said, "I don't have the time to write a paper." I said, "I know you can talk from the shoulder and tell us," and this morning I said to him, "If you will make a statement of the work done in your Bureau that can be sent to the members of the Board, if it be your pleasure, I will have it incorporated in the proceedings of this Board."

(Mr. Hutchison's motion was then adopted.)

## WORK DONE BY DAIRY AND FOOD BUREAU SINCE 1907

By JAMES FOUST, *Commissioner*

I regret more than I can express that my official engagements have made it impossible for me to be present at the meetings of the State Board of Agriculture. In order that your Board may have some idea of the work being done by this Bureau, I submit for publication in the Journal of your proceedings the following statement:

The eight million people of Pennsylvania spend about $90 each for food, making their food bill reach the interesting total of $720,000,000. Large as this sum is, the value of the public health and of the business morals to the community is vastly greater. The State Dairy and Food Commissioner is charged with the supervision of the food trade to see that the foods are clean, sound and unadulterated and their sale kept free from fraud. I respectfully present a summary of the operations and cost of this branch of the public service for the years during which I have been responsible for its direction. These figures show that the cost of the service is about twelve cents for each $1,000 of food purchased, but that the receipts from fines and license fees are about twice the expenditure; so that there is no direct tax upon the consumer.

I would especially note that the Cold Storage Act has been in force only about four months, but that the experience gained shows the desirability of improving the Act so as to make it less vague at certain points, and to make the owner and warehouseman jointly responsible for promptly disposing of foods made legally unasaleable by over-long storage, and to provide more perfectly for the care of cold-storage foods after their withdrawal from the warehouse for sale.

The following represents a summary of work done during the period of my service:

| Year. | Samples analyzed. | Cases terminated. | Receipts. | Expenditures. |
|---|---|---|---|---|
| 1907, | 7,400 | 664 | $55,732 68 | $78,455 88 |
| 1908, | 8,300 | 300 | 54,580 62 | 69,968 20 |
| 1909, | 6,200 | 797 | 86,594 15 | 83,700 00 |
| 1910, | 5,594 | 667 | 110,802,95 | 79,661 65 |
| 1911, | 8,200 | 1,029 | 120,993 48 | 83,083 15 |
| 1912, | 7,204 | 1,049 | 136,125 49 | 81,858 55 |
| 1913, | 6,846 | 1,025 | 178.789 76 | 75,587 12 |
| | 49,744 | 5,531 | $738,619 08 | $552,314 55 |

Comparing the receipts and expenditures for the seven years, the total receipts were $186,304.53 more than the expenditures.

MR. CREASY: I understand these reports are to be published. The report on Forest Fires—either I have been wrongly informed or else it don't quite agree with the information I have always seen in the newspapers with regard to the fires caused by the railroads. The statement has been made, and I have never seen it contradicted, except today, that at least 65% of the forest fires were caused by railroads. In the last session of the Legislature there was a bill introduced by Senator Hilton, providing that every person or corporation was to be held responsible for its fires, in accordance with the law laid down by Nathaniel Bacon, three hundred years ago. I have talked to a good many railroad men and they say, "We are going to get to that pretty soon." I believe if we want to have forests, the way to do is to lay down that old English law. As far as railroads are concerned, I live at a place where I can see these fires, have to go out and fight them, and I think that for the last fifteen or twenty years I have been called on to fight fires, it was always for a fire started by the railroad company. The people in Canada, I called on their Forestry Department at Toronto, and they have got a very stringent law in regard to railroads, and every railroad lives up to it by keeping somebody on the job when there is a dangerous time. I can very well see that one railroad is not going to take the precaution if they are not all compelled to do it. It would seem to me, that these railroads, as well as other people ought to be held responsible for the fires they have on their property, something similar to the Hilton Bill.

I believe the railroads are the cause of a great many fires. I know of property beyond Williamsport that has been burned over for thirty or forty years, and I am just as satisfied as that I am standing here that those fires could have been kept out; we will have the forests if you just keep the fires out. If I have been wrong on this railroad proposition about the railroad causing all the fires, I want to be corrected, because I have seen the statement that as high as 85% of the fires were caused by railroads. This is a very serious matter in regard to forest fires and I believe that our railroads will yield if they find out that every railroad has to do it, because this timber question is a great question and I want to assure the Forestry Department, that, so far as the farmers are concerned, they are intensely interested in this forest business, in their timber loss, and are taking the greatest care possible about fires. Of course they cannot send to the Forestry Department about a fire when one is started, because by the time they would get the information, the forest would be burned up but that does not indicate—because we do not write to the Forestry Department—that does not indicate that we are not interested in this forest business, because the farmers are very much interested and they appreciate the work that the Department is doing in sending out these seedlings, etc., but I think we ought to go a great deal further in this fire business and hold people and corporations responsible for fires on their property; that was good English law two hundred years ago and would be good now.

MR. STOUT: Occasionally we have had some malicious person set fire to the woods, but in nine times out of ten I know from personal knowledge that the railroads are responsible for it.

MR. HEILMAN: The railroad set fire to a little strip of wood that ran three miles from my place and I was at an expense of paying $3.50 for getting the fire out.

SECRETARY CRITCHFIELD: If my memory serves me right, I referred to that matter in the last annual report of the department. I think I pointed out that it was almost impossible to place the responsibility in case there was a fire, that it was an exceedingly difficult matter to prove that the fire was started by the engine, and therefore, I recommended the enactment of a law which would make it obligatory on the railroad to patrol their roads through forests so that the fires could be put out immediately after they were started. I cannot remember everything that went into that report, but I know I had that in mind, and that, as a matter of course, will go before the legislature and possibly may result in some action.

The CHAIRMAN: Do not the railroads in some cases, especially in cases of individual loss, compensate for it? In fact I know that some of the railroads do compensate for individual loss like burning fences and so on.

MR. STOUT: I think it is only a matter of proof. If you have somebody that can see when they set fire to it, you have evidence, but if you have nobody around to see it, you haven't any evidence. Some years ago I knew the railroads set fire to the surrounding timber and asked the constable, "Why don't you report it to the District Attorney?" He says, "I spoke to him;" but at that time the District Attorney and everybody else had a railroad pass and the constable said, "The District Attorney said that I shouldn't say anything about it."

MR. HEILMAN: I don't want to be understood as being in favor of passing a law for the railroads only; I want a law that will apply to the other fellow as well as the railroad. I am not one of those fellows coming here asking for special privileges for the farmer; I want a law that will let everybody come under it, railroads as well as everyone else.

Vice President Wilson took the Chair.

The CHAIRMAN: If the Committee on Resolutions are prepared to report, we will hear their report now.

## REPORT ON RESOLUTIONS

The Committee on Resolutions then presented the following report, which was adopted, each resolution being first read and adopted separately:

*Resolved:* That the Legislative Committee of the State Board of Agriculture frame or have framed, an act which shall require all fertilizer manufacturers or concerns selling fertilizers or offering fertilizers for sale to stamp on the bag or container of such fertilizer, in addition to the present requirements, the source or sources from which is derived the nitrogen, the phosphoric acid, the potash, or any two or all three of these elements as the case may be. The act should provide for the chemical analysis of samples and provide that brands found not conforming to printed statement on bag or container, should be refused license thereafter.

*Whereas,* There is a movement to have a National Corn Show in Philadelphia in the year 1915, to be financed by the Corn Exchange Bank of Philadelphia.

*Resolved:* That the State Board of Agriculture encourage such a movement and give to it our hearty co-operation without pledging itself to any financial support.

*Resolved:* That the State Board of Agriculture hereby expresses its great pleasure in having in our meeting and on our program the heads of the other departments of our State Government and believes that a proper understanding of our relations to each other will be promotive of good to all.

JOHN SHOENER,
G. A. BENSON,
B. F. WAMBOLD,
J. A. HERR,
F. S. BRONG,
Committee.

After the adoption of the foregoing resolutions, the following resolution, also reported by the Committee on Resolutions, was read:

*Whereas,* The Highway Department has the legal right to call a road convention anywhere in Pennsylvania at any time it may deem best, and

*Whereas,* Such convention will develop and strengthen the friendship between the farmers of Pennsylvania and the Highway Department, and

Google

*Whereas,* The road drag patrol system as revealed before the State Board of Agriculture, has produced such wonderful and economical results,

*Be It Resolved:* That it is the sense of this body that we urge upon our Deputy Highway Commissioner to follow out the more frequent road convention in patrol school demonstration on the township roads rather than in the comfortable and dry court houses, and

*Be It Further Resolved:* That our Deputy Highway Commissioner inaugurate a road drag patrol demonstration school in every county in our great State.

MR. DE WITT: I would say, just on that resolution, that the Highway Department is going to visit every county in the State and meet the supervisors of the townships of that county; they are at that business at the present time and it is proposed to pursue that until every county is visited, and I think it is a very wise thing for the Department to do, and a good thing, and if we, as a people, will be a little patient, I have faith to believe that the Department will soon let every man within this Commonwealth that is interested in roads know what the road laws are and the provisions of the road laws and give them the assistance to build good roads that they are entitled to give the people. We must not get in too much of a hurry. We may think that they are slow, but these men are doing the best, in my judgment, that they can do, and if they come out to each county, it is not confined to the supervisors at all, it is confined to the people, and address the people and explain to them the laws and help them, it is up to the people to come out and hear them.

MR. SHOENER: It seems to me, Mr. Chairman, that if it is the intention of the Highway Department to have these meetings, it would be a good idea for the farmers of this State or this Board to encourage the movement and assist them.

SECRETARY CRITCHFIELD: My thought is that the idea is the minds of the Committee—although I cannot speak for the Committee—is, that inasmuch as there seems to be a little anxiety upon this question and some disquietude, that it is well enough to hold this resolution over. This resolution has gone to the Committee and, in order that the Board may have time to see what is going to be done, what will result between now and the time of our meeting in May, their recommendation is that this matter be held over; am I correct?

MR. SHOENER: That is my view.

SECRETARY CRITCHFIELD: So I think there is nothing to do but let the matter rest. This is a Standing Committee; it remains on duty during the entire year. The service of this committee will not end until the next annual meeting, and I have no doubt that, if the Committee sees that the Department is making the move we all believe it is likely to make just as soon as conditions are favorable, then of course there will be no further action.

MR. JOEL A. HERR: It was my suggestion that this matter be deferred. I think we want to give the Road Department a chance to inform us of their intention and that we must not act prematurely on that, because we haven't the knowledge, we have not been in close connection with them enough to know exactly what they are going to do, and this will allow us between this time and that, and that is early yet in the year for road making, to receive some information as to what they propose to do and get in line with them. I think we are coming to understand their intentions better, and the more we get acquainted with them, I think the less friction there will be between us.

MR. HUTCHISON: This seems to be quite an interesting question. Mr. McCaskey came up yesterday and gave us some talk of what they were doing in Lancaster. His pictures were all right, but bless you, there's hardly a county in the State but what is working the same way. The Highway Department has 1,100 of those drags working; there are three in our township that have been working now over 800 miles of road; Lycoming county has three or four hundred of those King drags working. They are splendid things and the State had them and they were working, but in the wisdom of the Auditor General, the money that the automobile people paid in has been tied up and all the machinery and drags and everything that was being done by the Highway Department all over the State has been stopped. You cannot run a drag without a team or without a driver. Now that was their work that they were doing. The farmers up through the State have been at this question of dragging the roads. It is a good movement and I believe that these conventions will be good things if this information is taken out to the people. We have all been talking good roads for years; my brother Downing here talked them all over the Commonwealth, and if this money had been let loose and been spent on the roads, we would have had several hundred miles or more of good roads in this Commonwealth, because they were making them. There is no question about it; but those engines and scrapers and plants are all lying idle today over the State, under sheds, and the money is lying in the banks and there it is tied up.

Now what we want to do is to get that money loose and get it to work; that would solve this question. I am as much interested in good roads as any man that lives in Pennsylvania. My people have lived on the soil since 1792 in this country and I am an American and I am a Pennsylvanian and I want to see the best highways that can be built for the least money. There's no one person got a patent right on his advocacy of good roads. We all have an interest in them, from the man who lives in the palace to the man who lives on the smallest farm in this State. We do not differ, but don't let us drag it down, let us elevate it, let us do what is right in this matter and we will get roads, I pray, in our generation and in our time.

MR. CREASY: I would like to ask how much money is tied up? I was in the Auditor General's office last summer and it seems. now I may be misinformed, I want to try and enlighten myself—

MR. HUTCHISON: Mr. Creasy knows where to get that information as well as I do.

MR. CREASY: This is the point: I understood — I may be wrong—that there was a certain amount of money tied up; in other words, there was a lot of money to be distributed according to the road mileage of the different counties of the State. The Auditor General told me he was ready to distribute that money in that way, but I understood him to say that the Highway Commissioner wanted it the other way and he could not violate the law. If the Legislature wrote into an act that a certain amount of money that came from automobiles or anywhere else was to be distributed according to the road mileage to the different counties of the State, that is the way to get the money; I don't think we ought to let those Departments fight each other when the law is absolutely plain. If that is the case, if I am right, I think the Highway Department ought to take this money and distribute it to the different counties, because that has been one of the contentions all along, the money was to be distributed according to the road mileage.

MR. HUTCHISON: I think that is another bill entirely, another act of Assembly under the dirt road, and the only way to decide that would be to have those two acts here before us.

MR. SCHULTZ: If we want good roads, we either have to make them or pay for them, there is no question about it; nobody will do it for nothing. I believe that every farmer ought to take pride enough in his farm property to make the road along his property, if it is a mud road, himself. I did it and did it for years. I made my own drag, it did not cost the township one cent, and every time after a rain my men had orders to take the team, hitch it to that drag and go over that road. Many a time people came along there and when they got on that piece of road, they stopped and wanted to know whether the township made that road or the county or who took care of that road. It was no expense, practically to me, simply a little attention; and the pictures we were shown the other day on this canvas, I'd be ashamed if I had a road of that kind along my property, I'd take care of it myself before I'd allow it; it don't speak well for the farmer.

SECRETARY CRITCHFIELD: I move the adoption of the report of the Committee on Resolutions as a whole.

The motion was seconded and carried.

The CHAIRMAN: The report of the Legislative Committee is next on the program.

MR. McGOWAN: In the absence of Mr. Blyholder, who left for his home last evening, the Committee beg leave to submit a brief report with the promise that the report will be more extended at the summer meeting at Stroudsburg.

MR. CREASY: This road proposition that I am so much interested in and have spent years and years on, I would really like to have this cleared up, and if there is no objection, I think we can get the Auditor General here to explain his side of this proposition, and I would suggest that we get him here to explain why this money is held up, if there is a reason for it.

SECRETARY CRITCHFIELD: We might proceed now until we are done and in the meantime, if the Auditor General comes in, there will be an opportunity for him to say something.

MR. CREASY: What time?

SECRETARY CRITCHFIELD: It will probably be fifteen minutes.

MR. SCHULTZ: I think we ought to have both parties here. Why not get Mr. Jones here?

MR. HUTCHISON: I think this matter is in the courts for a decision. I would like to hear them, but it is before the courts to be decided.

MR. SCHULTZ: Oh, we will be dead before the courts decide.

SECRETARY CRITCHFIELD: If it be the opinion of the Board that these gentlemen ought to be asked to come in, they can fix that by resolution; that is a matter for the Board. It was simply a suggestion that if anybody dropped in here and wished to take part in this discussion, there isn't any reason I can see why they should not do so, but the whole matter is in the hands of the Board. If it be the pleasure of the Board to call in the heads of these two Departments in order to make some explanation of the work they are doing, I cannot see that there is anything in the way of their doing so, and yet perhaps the propriety of such action might be questioned. The truth is that this Board is at least a quasi department of the State Government; here are these other two Departments of the State Government that have been participating in our meetings, and it is a question whether it is a proper thing, whether it would be the kind of courtesy that ought to be extended from one body associated with the Executive Department of the State Government to the other Department, to make such a request as that. I do not believe that we have any right to sit in council over what they are doing, but this matter is for you gentlemen. If any of you feel like making a motion, it is your privilege to make that motion, certainly.

MR. STUDHOLME: I would like to make that motion, that we invite both parties to come in and enlighten us on this proposition.

MR. RODGERS: I would second that motion, simply for the reason that Brother Creasy and other members of the State Board that are here—when we go home, the question will be asked, "Why is this money held up?" It is only for the information of the different counties that are represented here, to get that information back to our people. When we go back, they will ask, "Why is that money held up?" And say, "It was your business to find out, when you were at Harrisburg, to know why it is held up and what the possibilities will likely be of a decision coming so that the people can understand."

MR. WEIMER: I would like to amend that motion that we proceed with our business and call them in after we are through.

MR. RODGERS: As seconder of the motion, I will accept the amendment.

The CHAIRMAN: Our regular business will be all attended to in the next fifteen minutes; unless they come pretty soon, there will be nobody here.

MR. STUDHOLME: My motion was that the heads of those two departments, the Department of Highways and the Auditor General, be asked to call and explain why the road money is held up, and it was amended to read that they explain after we have completed our business.

The CHAIRMAN: It has been moved and seconded that the Auditor General and the representative of the Highway Department be asked to come before us and explain why the funds to be used for road purposes are being held up.

The motion was adopted.

MR. HUTCHISON: I move you that Mr. De Witt, the Chairman of the Road Committee, be requested to invite someone here to represent the Highway Department and that Mr. Creasy be appointed to invite the Auditor General.

The motion was seconded and adopted.

The CHAIRMAN: We will now have the report of the Legislative Committee.

### REPORT OF LEGISLATIVE COMMITTEE

MR. McGOWAN: The first paragraph of this report is as follows:

> The State Board of Agriculture hereby express our disapproval of that Act of Assembly which now demands that fruits and certain other products be sold at a greater weight for a supposed bushel than the actual weight of a full bushel, and we request that this law be so modified as to be proper and equitable to the farmers of the State.

I think now that we have potatoes at sixty pounds to the bushel, which is a little in excess of what a real bushel of potatoes weighs; apples are fifty pounds to the bushel and that is more than you can get in a bushel, unless you stamp or tramp them, and you don't have very nice fruit if you do a thing like that; you can't put enough on a bushel to weight fifty pounds.

The foregoing paragraph of the report was then, on motion, adopted.

MR. J. ALDUS HERR: Would there be any opportunity to add something to that?

MR. McGOWAN: Well, we can do that at our summer meeting.

PROF. SURFACE: It said "agricultural products," so that lets in potatoes and apples, and may I call attention to the justice of this? There are certain varieties of apples that weigh only 39½ pounds to the bushel, and the average is only 42 or 43 pounds; there's only one variety of apple, the Laurier, that weighs 50 pounds to the bushel, and when a man sells fifty pounds of apples for a bushel, he is selling a peck over a bushel.

The balance of the report of the Legislative Committee was then read as follows:

> We urge that the Legislature give us the necessary legislation for the regulation of the Commission business in agricultural products,—providing for protection against the unfair and unjust methods of some commission men.
>
> We recommend increased appropriation for protection by the State Police Force, and request our Legislature to give us such legislation as will provide greater adequate protection of life and property in the rural districts.
>
> We commend the action of the last Legislature in giving us a good Pure Seed Bill, thus protecting the farmers from the great annoyance of having their farms saturated by sowing noxious weed seed.
>
> We regret that the last Legislature failed in having a law passed regulating the use of lime upon our soils.
>
> We recommend that a Pure Lime Bill be passed during the next session of the Legislature, thus protecting the farmer of the State from spending money for useless brands of so-called agricultural lime.
>
> We recommend that some steps be taken for more protection to the farmers in the inspection of Commercial Fertilizers; that is, a more strict law of inspection of fertilizer factories, to ascertain the genuine elements of plant food used in the manufacture of fertilizers.
>
> We advocate a system of appropriation for construction of our Public Roads throughout the State, similar to the system now in vogue as moneys appropriated for our Public Schools.
>
> We commend the action of our last Legislature in giving increased appropriation for our Pennsylvania State College Farm Advisory Work, to Farmers' Institute Work and Department of Agriculture to further the work of greater development along Agricultural lines throughout the Commonwealth of Pennsylvania.
>
> S. S. BLYHOLDER,
> Chairman.
> H. G. McGOWAN,
> Secretary.
> H. C. SNAVELY,
> ROBT. W. LOHR,
> M. M. NAGINEY,
> Legislative Committee.

The CHAIRMAN: What is the pleasure of the Board as to these resolutions?

MR. JOEL A. HERR: I move the adoption of the report.

Motion seconded.

MR. J. ALDUS HERR: In our county, there is quite a good deal of lime sold by the bushel, I dare say the majority of it, that is by the measured bushel. As I understand, the legal weight of a bushel of lime is eighty pounds.

A Member: Seventy.

MR. J. ALDUS HERR: Well, we are invariably getting sixty to seventy-five. Why should not lime be sold by weight instead of measure? About three-fourths of our lime is sold by the measured bushel and we don't get our measure. That is the only thing I wanted to include in that. It can be brought up at the May meeting.

The motion to adopt the report of the Legislative Committee as a whole was then carried.

MR. McGOWAN: Mr. Chairman, I move that we reconsider a portion of the Executive Committee's report of yesterday, that portion relative to the appointment of the Entomologist and the creation of a new Specialist on Insecticides; I move that we reconsider that portion of our report.

The motion was seconded and adopted.

MR. McGOWAN: We make the following recommendations for Entomologist, Prof. H. A. Surface; for Specialist on Insecticides, Mr. J. D. Herr, Lancaster.

On motion, the report was adopted.

MR. STUDHOLME: May I, at this time, offer a motion on view of the fact that the report of the Legislative Committee and the report of the Committee on Resolutions are very important for us, I would like to make this motion, that in future the reports from these two committees be presented before the Board not later than the second day of our meetings.

The motion was seconded and adopted.

MR. JOEL A. HERR: This Committee on Resolutions was not appointed until near the close of this session. If this Committee on Resolutions is composed of different members at our next annual meeting, there will be another Committee on Resolutions. When are they to begin? And again, if we report at the May meeting of the Board at Stroudsburg, the meeting only consists of one session, the first session, so I don't see the object of this resolution.

MR. STUDHOLME: My idea was simply this, that the last day of this meeting is not very well attended and these resolutions ought to come up when the full membership of the Board are here.

MR. JOEL A. HERR: I agree that the Resolutions Committee ought to be required to report earlier, but when the Committee is not appointed until the close of the session, how are they going to report?

MR. STUDHOLME: There is no reason that I can see why this Committee sould not be appointed earlier in the meeting, no reason for waiting until the latter end of the meeting.

SECRETARY CRITCHFIELD: The Committee is appointed by the Executive Committee; the Executive Committee can make no report until they have an opportunity to meet and do their work after the election of officers. The Executive Committee is elected by the entire Board, therefore there must necessarily some time elapse between the opening of the session and the appointment of this Committee on Resolutions and the Legislative Committee also. I think it possible though, that it may be so arranged as to have the reports of these committees come in not later than the second day, as is suggested by the motion. It is a matter for you to consider.

MR. JOEL A. HERR: I ask, for information, when the term of this Committee expires; whether this Committee on Resolutions, acting at this meeting, is to act and be the Committee on Resolutions at the next meeting? We don't want two Committees on Resolutions at the same time.

SECRETARY CRITCHFIELD: Certainly, this is a Standing Committee, and is carried over during the entire year, the year that will end with the close of the work of the year 1914.

MR. JOEL A. HERR: Then we understand that this Committee shall act at the next annual meeting of the Board, and the Committee then appointed by the Executive Committee shall continue for next year; is that what I understand?

SECRETARY CRITCHFIELD: No, sir.

MR. JOEL A. HERR: Then there will be two committees at the same time.

SECRETARY CRITCHFIELD: This Committee, like all standing committees, will continue during the present year, and at the close of the present year, at the close of the year 1914, this Committee will have accomplished its work and at the next annual meeting another Committee will be appointed for the year 1915, which will continue, like all the Standing Committees, for one year.

MR. CREASY: I would like to report that the Auditor General is here, ready to give his explanation.

MR. MAYER: I move that we hear his report.

SECRETARY CRITCHFIELD: Perhaps we had better wait just a few minutes.

MR. MAYER: While we are waiting, I would like to ask a question. According to the law of 1853, the Board of Agriculture was established and on that Board the bee-keepers and the poultrymen were given a seat. Now I would like to ask this body to correct an error which has crept in and which has been carried along, and that is, the representative here called on the program adopted by the Pennsylvania Branch of the American Poultry Association—I am a life member of that branch and also President of the Pennsylvania Poultry Society—I wish to say that that branch has no right to be a member of this Board, because it is not a State organization, it is a National organization, and I would like to make a motion that Mr. W. Theodore Wittman, who is also a member of the Poultry Society, be made a member of this Board to represent the Pennsylvania State Poultry Society, instead of the Pennsylvania Branch of the American Poultry Association. I believe, Mr. Secretary, that that should be done, because it corrects a legal phase over which we had some conflict with the Legislature last year, when we asked for an appropriation. I would ask the Board to act on that amendment to change this report, to cut out the title of the Pennsylvania Branch and substitute the State Poultry Society for it, with Mr. Wittman as our representative on this Board. As President of the Society, I have appointed him.

(Motion seconded.)

MR. JOEL A. HERR: Before that vote is taken, should not credentials be prepared and submitted to the Board, and the Board then act?

The CHAIRMAN: Would not this appointment be his credentials?

MR. JOEL A. HERR: Well, he ought to present his appointment in writing as credentials, so that we could act upon it.

SECRETARY CRITCHFIELD: My understanding of the matter is that the President of the Association has the right to appoint, that is a matter for them to determine, and the President is here and has stated to the Board in open session that he has made this appointment. That is the reason I seconded the motion, and I think that we have the very best evidence that it is possible for us to obtain, of his right to represent this Association on the Board.

MR. HUTCHISON: It is only recognizing another society, if Mr. Mayer is right in his statement, and I have no doubt he is, we are just transferring from one society to the other—correcting our records.

MR. MAYER: I was trying to make our records legal, that's all.

(The motion was then adopted).

MR. CREASY: Mr. Powell, the Auditor General of Pennsylvania, is here, ready to report.

MR. POWELL: Mr. Chairman and Gentlemen of the Agricultural Board, I was engaged in the settlement of some corporation taxes when my friend, Farmer Creasy, came over after me, and I did not have an opportunity to know just what you wanted to know and just what questions you wanted to ask me, but I want to say to you that I am prepared to answer any question you want to know about the expenditures, so far as the records of my office will show them, and to answer any question as to the position of the Department at this time or any other time. And I want you to bear with me a little bit, because you will understand that it is impossible for me to know more about the details of the Highway Department than the Commissioner of Highways, while at the same time I am called upon to know about the details of the Health Department, the Department of Internal Affairs, the Department of State and everything else, because every dollar that comes into the State Treasury comes in over the Auditor General's signature, or he must countersign the receipt. Every dollar that goes out, goes out in the same way.

MR. HUTCHISON: Brother Creasy was to state to you our position.

MR. POWELL: If you will just bear with me a minute until I give you the general idea of it, I will take up the other. That being the position, the best thing I could do was to get a man and put him on this stuff. We got a man named Swearingen, a farmer, civil engineer, and a good accountant, and he knows more about the Highway Department in detail than I know, and all he knows he tells me, and I have, as the chief of the Bureau of Accounts, Mr. Rodgers, the former Deputy or Auditor General's assistant, and I believe the ablest man who has ever been in that position, and, so far as I know, the ablest man I could get for it, and that is the reason he is there. Now, if somebody will state the principal question you want me to answer, I will be glad to do what I can.

MR. CREASY: The question is up in regard to this money that is being held up, as is charged, by the Auditor General's Department —to explain why it is held up and how much is held up?

MR. POWELL: Well, gentlemen, there has been so much newspaper publicity about that, that I am glad to have the opportunity to explain it to common-sense men. As a matter of fact, there is no requisition before the Auditor General's Department drawn upon funds which are lawfully in the State Treasury by the Highway Department, which has been refused.

Now I stand upon that proposition; not a dollar in the Department upon which a requisition has been drawn that has been refused. Now I will explain. The Legislature of 1913—and you will understand I was in the Senate at that time—came into existence in January, 1913. At that time it was represented to the Committee on Public Roads, of which I was a member, that there was about $1,400,000, which had come into the State Treasury as the result of receipts of automobile license fees and fines from the original passage of the Act in 1909 till that date. The Legislature passed an Act of Assembly, a separate Act, appropriating that $1,400,000 to the Highway Department, and that Act was honored, requisitions were drawn upon it and substantially all of that funds has been paid out and spent by the Highway Department. Then, along toward the close of the session, they alleged that there was $400,000 more in there as the receipts from that fund, and an Act of Assembly was drawn and passed, appropriating that $400,000 for the use of the Highway Department, and Mr. Creasy, Mr. Humes, the Democratic leader of the House, and other members of the House and Senate, insisted, with the Highway Department, that that Act should provide for a proportionate expenditure of the appropriation in each and every county of the State of Pennsylvania, and although there was opposition to that amendment, the amendment prevailed and the Act was passed in that form. That was honored by me after I came into the office of the Auditor General and I simply required the Commissioner of Highways to certify that he was spending it in proportionate amounts, although his vouchers did not absolutely show upon their face that the expenditures were made in counties in proportion; so that $2,200,000 of automobile license fees, which were in the Treasury prior to the close of the Legislature of 1913. were properly appropriated; warrants upon those funds have always been authorized and no payment has been retained. After that was done, the Legislature then passed this Act upon the 23d day of May, 1913, which purported to be an amendment of the 21st Section of the Act of 1909, regulating motor vehicles. The Section as amended read this way:

Section 21. The moneys derived from the registration of motor-vehicles, and from licensing operators thereof, under the provisions of this act, shall be paid into the State Treasury; *and all such moneys hereafter paid into the State Treasury are hereby specifically appropriated at the State Highway Department, for the purpose of the construction, maintenance, improvement, and repair of State Highways and State-aid highways, as described in the act creating the State Highway Department, approved the thirty-first day of May, Anno Domini one thousand nine hundred and eleven. The Auditor General shall, upon requisition from time to time of the State Highway Commissioner, draw his warrant upon the State Treasurer for the amount specified in such requisitions, not exceeding, however, the amount in such fund at the time of making such requisition.*

Now, while Mr. Rogers is finding the Act for me, I will say that we then took up the question of the regulation of motor vehicles and the increase of the fees which were to be paid for the licensing of motor vehicles, the general law changing the regulations. That general law, after considerable discussion and amendment backward and forward, was finally brought to a vote and passed, I believe, on the seventh of July. Now, in that Act, the Legislature again attempted to include substantially the same wording as that which I have read you from the Act which was passed on the 23d of May. Under this Act, passed on the 23d of May, the Highway Department should have taken a copy of that Act as soon as it was signed, down to the State Treasurer, and demanded that all money that was in his hands as receipts from license fees should be kept in a separate fund. that he put them in a separate fund and mark it, "Highway Fund" or "Automobile Fund," and it is so shown on our daily balance sheet to this day. He created that separate fund. This is the provision of the Act amending that same section again.

Section 10. The moneys derived from registrations and from license fees under the provisions of this act shall be paid by the State Highway Department into the State Treasury, for safe-keeping; and shall by the State Treasurer be placed in a separate fund, to be available for the use of the State Highway Department upon requisition of the State Highway Commissioner. All such moneys hereafter paid into the State Treasury are hereby specifically appropriated to the State Highway Department, for the purpose of assisting in the construction, maintenance, improvement, and repair of State Highways and State-aid Highways, as described in the act creating the State Highway Department, approved the thirty-first day of May, Anno Domini one thousand nine hundred and eleven. The Auditor General shall upon requisition, from time to time, of the State Highway Commissioner, draw his warrant upon the State Treasurer for the amount specified in such requisition, not exceeding, however, the amount in such fund at the time of making such requisition.

That Act was passed and signed by the Governor on the 7th day of July, 1913. A few days after that Act was passed, a requisition was drawn upon me by the Highway Department, which said, "Balance in the fund, etc." I told the officers of the Highway Department that I would have to look into the matter before the requisition was honored. I then ran up against the specific Appropriation Act of 1909, which is as follows:

## AN ACT

Making it a misdemeanor for any officer of this Commonwealth to authorize to be paid, or for the State Treasurer to pay, any money out of the State Treasury except in accordance with the provisions of an act of Assembly specifying the amount and purpose of the expenditure; or for any officer of this Commonwealth to authorize to be paid, or for the State Treasurer to pay, any money out of the State Treasury in excess of the amount of such specific appropriation; and providing penalties for the violation thereof.

Section 1. Be it enacted, &c., That from and after June first, nineteen hundred and nine, it shall be unlawful for any officer of this Commonwealth to authorize the payment of any money, by warrant or otherwise, out of the State Treasury, or for the State Treasurer to pay any money out of the State Treasury, except in accordance with the provisions of an act of Assembly setting forth the amount to be expended and the purpose of the expenditure, and it shall also be unlawful for any officer of this Commonwealth to authorize the payment of any money, by warrant or otherwise, out of the State Treasury, or for the State Treasurer, in excess of the amount thus specifically appropriated: Provided, however, That the provisions of this act shall not be construed to prohibit the Auditor General and State Treasurer of this Commonwealth from returning to the various counties thereof the proportion of the personal property tax authorized by law to be returned to said counties; or the Auditor General and State Treasurer of this Commonwealth from returning to the several cities, boroughs, and townships of the first class thereof the proportion of the tax on premiums received from foreign fire insurance companies authorized by law to be returned to said municipalities.

Section 2. That any office of this Commonwealth violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be sentenced to pay a fine not exceeding five thousand dollars, and undergo an imprisonment for a term not exceeding two years, or either or both, in the discretion of the court.

Section 3. All acts or parts of acts inconsistent herewith be and the same are hereby repealed.

After reading that Act and considering the Constitution very carefully, I decided that I'd rather stay at large and that I'd leave that money in the State Treasury. Now, that is the thing in a nutshell, and there I want to say that immediately work was stopped by the Highway Department all over the State, and they gave out the word to everybody, "You can't get your money, the Auditor General won't let us have it"; and they even stopped the payment of vouchers previously issued for the pay of men working upon the roads and they told the banks that they could not get the money from the Auditor General's Department, and after that went along for about two months or until about September, so many of my friends all over the State kept writing in as to the situation, that I finally, after due notice to the Republican State Chairman, Mr. Crow, told him that I would give out the exact facts, and I gave out a statement showing that at the time, or as of the date of September 1st, 1913, the Highway Department had on the books of our office a credit of three million, nine hundred and ninety-nine thousand and some hundred dollars, and that statement was absolutely correct, not only to the dollar, but to the penny, and it has never been disputed. The Highway Department then proceeded to let 18 contracts, upon the 18th of September, and upon the last of September, gave out a statement saying that it did not have that sum to its credit at that date, and my only reply hereto was that that did no dispute my word at all, that if I said it was a nice, bright day in Harrisburg today and rather warm weather, that did not justify any other officer waiting until along in the middle of February and saying: "Powell's a liar, it's snowing and raining today."

Now, that is the whole situation so far as the happenings have been for the last nine months. But now let me call your attention to something else, here is the funny part about it, and I am going to give my case away here, as a public official, and disregard my usual practice as a lawyer. I usually keep my mouth shut until the case comes to court, but I am going to tell you now that the suit of mandamus which was brought against me to compel the payment of that money has never been pushed. Mr. Hampton Todd, the former Attorney General of the Commonwealth, voluntarily offered his services to support and maintain the Auditor General in that suit, because, in his letter, he said that he believed that specific appropriation act of 1909 was the most important act upon the statute books of this Commonwealth and that, if it had been passed a number of years before, we never would have had the Capitol graft scandal which was a stench in the nostrils of every decent citizen of the Commonwealth.

I advised the Attorney General, representing the Commissioner of Highways, that, associated with Mr. Todd, would be D. T. Watson, of Pittsburgh, and John B. McNamara, and from that day to this, that is the last I have heard of that suit, but I want to show you something.

Now this Act of 1913, which made the specific appropriation, was passed on the 7th of July. The requisition was drawn upon me on the 29th of July and refused about August. You notice that Section 10, that I read you, said, "All moneys derived from registration and from license fees under the provisions of this Act." Now, Section 24, when I sat down with the seven lawyers that I have in my own Department there as subordinates—and they are good lawyers, too, Mr. Rogers, Mr. Murray, Mr. Hill and Mr. Hess, and one or two others—Mr. Lehman—graduates from Harvard Law School, myself a graduate of Yale, Mr. Hill a graduate from the Western University of Pennsylvania, and a number of other institutions that were worth while listening to, at least—we were a little bit in doubt about it until I said to them, "Now there is something in that Act"—I read the Act when I was on the Committee on Highways, "and I know there's something in that Act that does not authorize this requisition." This proviso was the last paragraph of the Act: "Provided, however, that the provisions as to the registering of motor vehicles as set forth in Sections 1, 2, 3, 4 and 7 of the Act approved April 27th, 1909, and relating to motor vehicles," etc., etc., and citing some other acts, "shall remain in full force and effect until December 31st, 1913, when the provisions as to registering motor vehicles as set forth in this Act shall become effective."

Now the Act itself provided "that all moneys derived *under the provisions of this Act., etc.,*" and then in this clause it said that it did not take effect until the 31st of December, 1913, and when I refused that requisition, no law officer or other officer of this Commonwealth outside of my Department ever seemed to have read the Act under which they claimed the money. Up to the 31st of December, 1913, there was not one dollar or one penny in the State Treasury applicable to the requisition of the Commissioner of the Highway Department, and I think that any lawyer of any standing anywhere on earth will tell you that that is actually the truth, and it don't need a lawyer to know it, because you can understand plain common sense and plain English yourself. The best lawyer I know is a man with common sense.

Now, gentlemen, if there is anything else you want to ask me, I will be glad to tell you. I have been absolutely frank with you. I have kept out of the newspapers as far as I could, but I am glad of this opportunity to explain to you, because you are citizens of the Commonwealth, you are taxpayers, you live along these roads and are entitled to the information.

A Member: What is the total amount of money on hand?

MR. POWELL: The total amount of money on hand? I cannot tell you, gentlemen, the exact figures on that until Mr. Swearingen comes back with the amount, but it is about five hundred thousand dollars, I think, now, which has really come in under the provisions of this Act of Assembly, and upon which the question of payment would be properly raised on this Act of 1909.

Now, I offered to the Highway Department to take the matter up in an amicable way and offer a case stated, so that the Supreme Court might pass upon the matter and I might have protection, because I don't want to go to see John Francis or Warden McKenty, and I offered to take it up in that way, in an amicable way, and have them decide whether or not it was payable, but the adverse action in the way of a mandamus was brought and is still pending. Now, there's about five hundred thousand dollars in that fund, which has been derived under the provisions of that Act, but there was no money in the fund at the time the requisition was drawn and no money has been drawn or no requisition has been drawn since the 31st of December and the question has not properly come up.

A Member: What is necesary now for the Highway Department to do in order to secure this money?

MR. POWELL: Have a meeting of the Legislature and pass a proper Act. That is the plain truth about the matter. The position of every good lawyer with whom I have discussed this question is that the Legislature cannot, by using the words "specifically appropriated," make that which is indefinite in amount, indefinite in purpose and indefinite as to date of receipt, be a specific appropriation. If the law requires that I shall pay you a specific sum, it means that that shall be a sum definite, not what somebody else may pay me at some time in the future or may not, and to my mind, that money is still in the State Treasury and will be available for the use of the Highway Department upon the passage of a proper appropriation bill, just as the passage of the one appropriating the $1,400,000 and the $400,000, and I may say that this is not the only Department that has that question raised.

The Game Commission has substantially the same subject up in regard to the payment of bounty for noxious animals: It says, "One-half of whatever shall come in from the license fees of resident hunters shall be used as a fund to pay bounties on noxious animals." Now that is not naming a definite amount and nobody can make it definite. Nobody knows how much is going to come in and nobody knows how much is going to be there to be paid out at any time.

MR. CREASY: How much money is there in the State Treasury that is available now to the Highway Department without any further laws?

MR. POWELL: That is contained in another set of books and we didn't bring Mr. Brindle over; he is the man that handles that.

MR. CREASY: Have you got any idea about how much?

MR. POWELL: I think it's about $1,500,000.

MR. CREASY: Available now?

MR. POWELL: Still unexpended, yes. Now, the receipts from automobile license fees from the first of January, for the month of January, 1914, are $355,030. The receipts from automobile fines are $235, making a total of $355,265 available last night at the close of the Treasury for future appropriation by the Legislature to the Highway Department. But, gentlemen, you understand my situation exactly, I think. I am not the Legislature; the Constitution does not say that the Auditor General can make laws; it says that the Legislature shall make the laws, and the Legislature meets and throws in a jumble of stuff and then adjourns. I try to make common sense out of what the Legislature said last, and I have no remedy whatever except to follow that as the law until the Legislature meets again and changes it.

If any of you are County Commissioners, you know the difference. The Legislative Board for a county is the three Commissioners; they can meet any day they want to and change the rules and regulations; they can issue bonds and they can do a thousand other things, they can do practically anything that the people of the county can do, but the power which is reposed in the people of the State of Pennsylvania under the Constitution rests primarily in the two Houses of the Legislature and the Governor. Until they have spoken, I have no power or authority whatever, and after they have spoken, my power and authority is limited absolutely by the hodge-podge of statements which they have made. If they say black is white, then, for two years black is white, so far as the Auditor General's Office is concerned, because they have the final say and they represent the people of this State. Whatever the people of this State say to the Auditor General's Office, for a little while, at least, is going to be what goes over there, because just now I happen to know the fellow that holds the job. Mr. Rogers calls my attention to the fact that there may be more than that amount of money in the Treasury which would be available, because some license fees were paid under the provisions of that Act by way of an advance application prior to the 31st day of December. You see that would raise another nice question of law, whether they were really paid and whether they are receipts under the provisions of that Act as it has been read, but that is a small matter, it is a question of $200,000.

MR. CREASY: This $1,300,000 that is available now, how long has that been available for the Highway Department?

MR. POWELL: Oh, ever since the last session of the Legislature. The Highway Department, by the last session of the Legislature, received an appropriation of $7,152,708.92, and the total appropriation from June 1st, 1911, to September 1st, 1913, including the money paid into the Automobile Division, has been $8,071,830.29.

MR. CREASY: And this $1,300,000 they could have used any time they'd have drawn their warrant; is that the way I understand it?

MR. POWELL: I am glad you asked that question, because that is the only way you can help me to give you an absolutely clear statement in regard to this matter and a statement which you will understand and everybody will understand. You see the Highway Department, in arranging its various funds for the General Appropriation Bill, put $4,000,000 for construction work, in the General Appropriation Act. Then it put in something for experiments and tests, then it put in another sum for State-aid construction. It put in another sum for payment of the State's share of township roads, I believe, etc., so that while these funds are vailable to the Highway Department as a department, I do not want you to misunderstand me to say that all of those funds are available for the actual construction of new Sproul routes, because I want to be absolutely fair to the Highway Department.

Don't misunderstand me, I am not attacking them, they have their troubles, the only difference I have with the Highway Department is that they did not even attempt to tell the truth about the Auditor General's office, and I make that statement now publicly. Now I guess that answered your question, didn't it?

MR. CREASY: The question in my mind was this: They were saying there was no money available for these roads and some time in September they quit working these Sproul routes that they had taken over, they said there was no money here to fix those roads; what we are trying to get at is whether there was or was not?

MR. POWELL: Well, I will say to you that I can give you and will be very glad to give a committee of this Board the exact amount that was in each fund upon any day of the year, that is, that was available for the construction of Sproul routes, that was available for the maintenance of Sproul routes, that was available for the construction and maintenance of State-air routes, etc., because we carry all those items in separate accounts and keep a multitude of accounts with the Highway Department, carrying every appropriation just as it is given. Now, the trouble was this—

MR. CREASY: Then there was money available in September to keep the Sproul routes in repair, was there or not?

MR. POWELL: Oh, yes, there was, there was money enough for them to let 18 contracts against it on the 18th of September, and then say I hadn't told the truth on the first; and I can give the amounts of those contracts and have the copies on file in my office. Here is the provision of the General Appropriation Bill for the State Highway Department:

### STATE HIGHWAY DEPARTMENT

For the payment of the salary of the State Highway Commissioner, two years, the sum of sixteen thousand dollars ($16,000).

For the payment of the salary of the First Deputy State Highway Commissioner, two years, the sum of twelve thousand dollars ($12,000).

For the payment of the salary of the Second Deputy State Highway Commissioner, two years, the sum of twelve thousand dollars ($12,000).

For the payment of the salary of the Auditor, two years, the sum of six thousand dollars ($6,000).

For the payment of the salary of the Chief Engineer, two years, the sum of fourteen thousand dollars ($14,000).

For the payment of the salary of the Bridge Engineer, two years, the sum of seven thousand two hundred dollars ($7,200).

For the payment of the salaries of fifty superintendents, two years, the sum of one hundred and fifty thousand dollars ($150,000).

For the payment of the salaries of fifteen Assistant Engineers, two years, the sum of seventy-two thousand dollars ($72,000).

For the payment of the salary of the Chief Draftsman, two years, the sum of four thousand eight hundred dollars ($4,800).

For the payment of the salaries of four clerks, two years, the sum of nine thousand six hundred dollars ($9,600).

For the payment of the salaries of a Paymaster and two assistants, to be appointed by the State Highway Commissioner, two years, the sum of twelve thousand dollars ($12,000).

For the payment of the salaries of a statistician, to be appointed by the State Highway Commissioner, two years, the sum of six thousand dollars ($6,000).

For the payment of the salaries of four draftsmen, two years, the sum of fourteen thousand four hundred dollars ($14,400).

For the payment of the salary of a chief clerk, two years, the sum of four thousand eight hundred dollars ($4,800).

For the payment of the salaries of two bookkeepers, two years, the sum of six thousand four hundred dollars ($6,400).

For the payment of the salaries of four stenographers or clerks, two years, the sum of nine thousand six hundred dollars ($9,600).

For the payment of the necessary traveling and other incidental expenses of the State Highway Commissioner, the First Deputy State Highway Commissioner, the Second Deputy State Highway Commissioner, the Chief Engineer, the Bridge Engineer, the fifteen Assistant Engineers, the fifty Superintendents, the two Maintenance Engineers, and the Paymaster and his assistants, two years, the sum of one hundred and twenty-five thousand dollars ($125,000).

For the payment of contingent and incidental expenses of the State Highway Department, two years, the sum of seventy-five thousand dollars ($75,000).

For the payment of the salaries and other necessary expenses of the Automobile Division of the State Highway Department, two years, the sum of one hundred and sixty thousand dollars ($160,000).

For the installation and equipment of a physical and chemical laboratory, for the payment of salaries and expenses of chemist and necessary laboratory employes for experimental work and tests, and for the payment of traveling and incidental expenses necessary to make a thorough and a comprehensive study of road construction, construction methods, and construction materials, two years, the sum of fifty thousand dollars ($50,000), or so much thereof as may be necessary.

For the permanent improvement of highways described in the act creating the State Highway Department, approved May thirty-first, one thousand nine hundred and eleven, and acts supplementary and amendatory thereto, as State-aid Highways, two years, the sum of one million dollars ($900,000).

For the maintenance of the improved and unimproved State Highways described in the act creating the State Highway Department, approved May thirty-one, one thousand nine hundred and eleven, and acts supplementary and amendatory thereto, two years, the sum of one million nine hundred thousand dollars ($1,400,000); for the payment of all other expenses, including the payment of salaries and expenses of such additional engineers, engineers' assistants, superintendents, inspectors, clerical assistance, and employes, necessary to carry on the work of the State Highways, two years, the sum of one hundred thousand dollars ($100,000).

For the construction and repair of State Highways described in the act creating the State Highway Department, approved May thirty-first, one thousand nine hundred and eleven, its supplements and amendments, and for the payment of the State's share of the maintenance and repair of State-aid Highways constructed prior to, or constructed or improved under, the provisions of the act creating the State Highway Department, approved May thirty-first, one thousand nine hundred and eleven, its supplements and amendments, two years, the sum of three million six hundred thousand dollars ($1,000,000); and for the payment of all other expenses, including the payment of salaries and expenses of such additional engineers, engineers' assistants, superintendents, inspectors, clerical assistance, employes, and labor, skilled or unskilled, necessary in the judgment of the State Highway Commissioner to carry out the work of the State Highway Department, two years, the sum of four hundred thousand dollars ($400,000).

For the payment of the necessary expenses in the acquiring of turnpike roads as authorized by the act creating the State Highway Department, approved May thirty-first, one thousand nine hundred and eleven, two years, the sum of two hundred thousand dollars ($100,000).

For the payment of deficiency in the salary and necessary expenses incurred by the employment of one superintendent of maintenance, not specifically provided for under the act of May thirty-first, one thousand nine hundred and eleven, for the period from April first, one thousand nine hundred and thirteen, to June first, one thousand nine hundred and thirteen, the sum of nine hundred eight dollars and ninety-two cents ($908.92).

This is for two years, of course; all appropriations are made for two years. Now you see they had a fund of $4,000,000 in there, and that last clause, of $400,000, was suggested by me to the conferee in regard to the general appropriation bill, for the reason that they claimed that they had not fully described all the clerks and assistants they needed in their department. So I drew this rider and put in for the payment of all other expenses so that I'd have a chance to give them anything I thought was good business practice, including the payment of salaries and expenses of such additional engineers and engineers' assistants, superintendents, inspectors, clerical assistants, employees and laborers, skilled or unskilled, necessary in the judgment of the Highway Commissioner, to carry out the work of the State Highway Department for two years, the sum of $400,000." I put that in myself to give them that much leeway so there could not be anything to hold up the department. Now the Governor, in his wisdom or unwisdom, cut that appropriation to $1,000,000, altogether $3,600,000, and that was their construction fund and it was up to me to let them have a maintenance fund or experimental fund or construction fund or some of these other funds appropriated for a specific purpose, or else when they used up their $1,000,000, and the $2,200,000 which had been appropriated by separate bills, they were done. I believe that the Highway Department now is telling the truth, that there is substantially no money in the State Treasury applicable to the present construction of Sproul routes; but on September first, at the time my statement was made, it was true to the penny and they had in that fund over a million dollars; isn't that right Mr. Swearingen?

MR. SWEARINGEN: I think it is.

MR. POWELL: There was over a million dollars, and my recollection is that it was about $1,500,000 that was still available for Sproul route construction alone, and against that they have let a number of contracts, and of course that money is now ear marked by the contractors, and though the money is still there, it is not available for the letting of new contracts. Is that what you wanted to know, Mr. Creasy?

MR. CREASY: And then the maintenance of those roads they have taken over—they took over about 10,000 miles of roads under the Sproul act and told us they were going to keep them in repair, and last summer they stopped work and said the Auditor General wouldn't give them any money.

MR. POWELL: At the time they stopped they had plenty of money and that statement was not true then; I believe it is true as of this date; I don't believe that they have very much money in that maintenance fund, I don't know the details of that, because I have not looked at it in the last few days. If we had known anything about it, about your wanting this information, we could have given you to the penny the full statement in regard to all these funds as of last night, but I didn't have any anticipation that the question was going to come up; but I will be glad to give it to any one of you or a committee if you will appoint a committee, and you can go in and examine our books and if anybody questions our books, they can be easily verified by the books of the State Treasury and if you think the two of us are not right, I guess the citizens of the Commonwealth will have to come and do it themselves.

MR. CREASY: Do I understand that from now on until the next Legislature meets, there will be no money available to keep these Sproul roads in repair, these 10,000 miles of roads that they have taken over?

MR. POWELL: Well, not very much, not enough. I think there is some in that fund, but not enough.

MR. CREASY: Not enough to keep them in repair for one year?

MR. POWELL: There's not enough, no.

MR. CREASY: In their appropriation, did they have that marked out? Did they have any plan for this maintenance and how much money it would take?

MR. POWELL: Yes, they represented to us that this amount they had in there for maintenance was exactly what they would need and we had a hearing before the committee and before these conferees, and Mr. Wilson, of the House, who was the principal conferee, insisted upon cutting that $3,600,000 down to $2,000,000 in the House.

MR. CREASY: That was the maintenance fund?

MR. POWELL: No, that was the construction fund, $3,600,000 for construction and $1,400,000 for maintenance.

MR. CREASY: They got all for maintenance that they asked for?

MR. POWELL: No, the Governor cut that too; but as we passed it in the Legislature we gave them for the maintenance of improved and unimproved State Highways the sum of $1,900,000 and for the payment of all other expenses for maintenance, I put the same clause in there to help them out, $100,000, then we gave them for the construction and repair of State Highways and the payment of the State's share for the maintenance and repair of State-aid Highways, $3,600,000 and the extra $400,000 I read you a while ago. Now, the Governor cut those amounts, instead of cutting down some of these salaries and experimental tests and travelling expenses, he cut out of construction and maintenance instead of cutting it out of the frills and the special salaries and things of that kind.

MR. CREASY: The point I am getting at is this: Then, as I understand it, the appropriation was correctly made to maintain these Sproul routes, that's maintenance and construction, and then, for some reason or other, the Governor cut off the very thing that the Highway Department had planned, the amount of money they should have to keep the roads in repair?

MR. POWELL: That is it exactly. There was $4,000,000 appropriated for construction and maintenance, construction of State Highway and maintenance of State-aid highways, and there was $2,000,000 appropriated for the maintenance of State Highways $6,000,000 was appropriated for construction and maintenance and the Governor cut those funds; in the first place, the $4,000,000 he cut to $1,000,00 and the $2,000,000 he cut to $900,000. He cut a $6,000,000 appropriation for construction and maintenance to $2,500,000, because he left in the two clauses I put in, for the $400,000 and the $100,000; he cut $6,000,000 to $2,500,000, and that is the place where the money should have been left to get it into the roads. What we want in this State, is to get the money into the roads; we don't care about the rest of it; if we get it in the roads, we are all right. Now, gentlemen, I don't want to take too much of your time.

MR. CREASY: Then that money is all spent that can be used to keep these 10,000 miles of roads in repair, or is it not? As I understand, I think the greater part of it is spent.

MR. POWELL: On that proposition, I don't like to give you exact figures as of last night; that is, I don't like to give you a guess as to what were the figures last night, but if you will have somebody come to the office, I will give you the exact figures, just what is in each of these funds, because I'd rather not have it go out as my saying one thing when the books of the office will show the exact figures, but once the books of the office are examined and the bookkeeper gives me the exact figures, I will sign the statement and stand on it, and if anybody can show me that there's a penny error in it, I will pay ten cents for every penny of error he finds; that is how much confidence I have in the men of my department. They are the most efficient public employees that have ever been on the

"Hill" in Harrisburg, and if the people ever get any better ones, the millenium will be coming around pretty fast. There was one man that held a political job in my office and he's gone.

MR. STUDHOLME: I make a motion that we appoint a gentleman to get these figures from the Auditor General's Department.

Mr. Schultz seconded the motion.

MR. CREASY: Could that committee be instructed to find out from the Auditor General just how much money is positively available to the Highway Department, not how much is available after the law is changed, but how much can the Highway Department draw tomorrow?

The CHAIRMAN: Write the motion out.

MR. CREASY: Mr. Hunter is here and I think we ought to hear from Mr. Hunter.

The CHAIRMAN: We will put this motion first.

Motion was then adopted.

The CHAIRMAN: I will appoint on that committee, Mr. Schultz, Mr. Hutchison and Mr. Rodgers. If Mr. Hunter wishes to make some explanation, he can now have an opportunity.

MR. HUNTER: Mr. Chairman and Members of the State Board of Agriculture: I don't know that I have very much to say. I had no opportunity of getting any information; in fact I didn't know what was going on until I got in the room here; and I want to say at the start that the matters in controversy between the Highway Department and the Auditor General, I know practically nothing at all about. Mr. Bigelow is absent and he has been attending to such matters and I don't know just what has taken place along those lines. I do know, however, from what little information I have received, that there is very little money available for construction work or for maintenance work to be carried on by the State Highway Department this year; and while there may be balances shown in the Auditor General's Department, that does not show the amount of contracts that are outstanding that have to be paid out of these funds. The appropriations as made were for a period of two years. The Highway Commissioner had no right to expend in the State-aid work more than half of that amount of money in any one year, neither had he a right to expend more than half the amount of money appropriated for maintenance in any one year, so that those balances are still left. The appropriation, of course, included the maintenance of the State highways and also the State-aid highways, and I presume that I can, from our department, find out just how much is available for that work. I don't know here, because I didn't ask when I came down, but that will make some difference in the balances.

First of all, the contracts that are outstanding are not charged up against these respective funds, and while there was money, quite a large amount of money, standing to the credit of the Highway Department last fall, this year's money that we expect to expend after the first of June of this year, was also included in that fund, so it was not money that we could use last year or that we can use now until after the first of June. I haven't anything further to say about those facts. The balances that the Auditor General will give will be correct as far as I know as to the balances actually on hand in the State Treasury.

MR. POWELL: You understand that a resolution was passed asking me to come over and answer some questions that they wanted to ask me.

MR. HUNTER: I understand; I knew nothing about it until the gentleman came up and asked me to come down.

MR. HUTCHISON: Wouldn't it be proper for this committee to call upon the Highway Department and ascertain what contracts were let to be charged up to this fund?

MR. POWELL: Yes, I think so. The only controversy I had was that they did not take the figures from the Auditor General's office as they were and then say, "Since this time we have left such and such contracts which we figure will consume so much of that money." That is what ought to be done this time and then there will be no dispute between these two departments; and after we give them the balances from our books, they can say how much of that is reserved for contracts which have been let and not completed, and then the people can get a fair idea of just how the matter stands, and the Highway Department has done itself more injustice than the people have done it; it should have been absolutely frank and given these figures at all times and thrown their books open, and I feel sure that if Mr. Hunter had been in charge, that would have been done, I want to say that for him, frankly.

MR. HUNTER: I want to say, Mr. Auditor General, that if my memory serves me correctly, the contracts that were let in September of last year were practically all State-aid contracts and were not contracts for the improvement of State Highways. They were all made for improvements under the section providing for State-aid improvement.

MR. POWELL: Well, the most of them were there is no doubt about that.

MR. HUNTER: And we are getting ready now to make contracts to use up the balance of the appropriation that is still available for State-aid work. Now, of course we will not be able to make contracts to cover all of that, because, under the law, that money that is available for the State-aid work is apportioned to the several counties of the State according to the number of miles of road in each county. There are a number of counties in this State that have made no application, so that we will not be able to use the money that is apportioned to those counties until the end of the year, June 1, 1915, because that much money appropriated or apportioned to the county must stay there until the end of the year.

MR. CREASY: The point I want to get at is this: I am elected Supervisor up there and we have some of this Sproul roads through our township. What I have been trying to get at is that the State, in taking over these 10,000 miles of road with the Governor's veto, never took into consideration how much money they needed to keep those roads in repair for two years and we have the constables returning these roads and going after us and we say it is the State's business to keep them up. What I want to know is whether they have got money to fix those roads this coming year or not, and if I understand the Auditor General, that appropriation was so reduced that the Highway Department could have readly seen in the start that they did not have enough money to keep them in repair.

MR. HUNTER: The Highway Department did take into consideration the amount of money necessary to maintain the roads and asked for an appropriation accordingly and it was made by the Legislature. I don't know from what point of view the Governor looked at the matter when he made the cut, but under the provisions made in the Automobile Law, the Highway Department, I understand, was supposed to have obtained that money as the money was paid in; that now amounts to something over $542,000; if that fund is not available and cannot be obtained until the Legislature makes a specific appropriation of the amount so paid in, then the money that was counted on as being used for part of the maintenance work will not be available.

MR. HUTCHISON: I move that this committee, which has been appointed to call on Auditor General Powell be authorized to call on the Highway Department also and ascertain how many contracts have been let and the amount of the same that will be charged up to this appropriation as indicated by Mr. Powell.

The motion was seconded and adopted.

MR. STUDHOLME: Of the total amount of money that was appropriated for the maintenance of the roads coming under the Sproul routes, is there still available one-half for this year's work?

MR. HUNTER: I cannot answer that question without the books; but I think not quite half of it, because the work was being pushed ahead quite rapidly with the expectation of being able to use the money paid in for automobile licenses, and the work started will probably consume more than one-half of the amount that was appropriated for maintenance.

MR. HUTCHISON: I move that we adjourn .

MR. SCHULTZ: I think we ought to extend a vote of thanks to representatives of these departments for coming here and making this explanation. The trouble in our State is a lack of confidence in our officials, and I think nothing better could have happened than what has occurred right here. We want to take the facts back to the people, that is what we need, and I think we ought to extend a vote of thanks before we adjourn. I move that a vote of thanks be extended to these public officials for the able instruction they have given us.

Motion seconded and adopted.

MR. STUDHOLME: Before we adjourn, when is this Committee to report, may I ask?

The CHAIRMAN: If we adjourn they cannot report to us at this session.

MR. STUDHOLME: What time will we meet again?

SECRETARY CRITCHFIELD: They cannot report until some time in May. How long will it take to get those figures?

MR. POWELL: So far as our office is concerned, you can get them about forty minutes after one o'clock.

MR. HUTCHISON: I move that the report of this Committee be handed to the Secretary and published as a portion of our proceedings.

## REPORT OF SPECIAL COMMITTEE ON ROADS

Placed in hands of Secretary, as per motion authorizing the same.

Harrisburg, Pa., January 30, 1914.

Hon. N. B. Critchfield, Secretary State Board of Agriculture, Harrisburg, Pa.—

My Dear Sir:—The Committee appointed at the Friday forenoon session of the State Board of Agriculture that convened January 28, to secure a copy of the records of the Auditor General and State Highway Department, showing the amount of money that was now available for the use of the State Highway Department, beg leave to forward herewith the statements received from these respective officers.

Very truly yours,

JOHN H. SCHULTZ.
MATTHEW RODGERS,
GEO. G. HUTCHISON,
Committee.

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Harrisburg, Pa., January 30, 1914.

To the Committee of the State Agricultural Board of Pennsylvania.

Gentlemen:—On behalf of the State Highway Department, the following information is submitted:

Out of the appropriations made by the Legislature at the 1913 session to the State Highway Department for State Highway construction, there remains a balance in the hands of the State Treasurer, the sum of $164,068,34, against which there is a balance due on contracts of $305,497.50. This item apparently is overdrawn, upon approval of the Act of May 23, 1913, P. L. 300, which appropriated the money paid for motor vehicle licenses to the use of the State

Highway Department, contracts were made accordingly and which money the Department has been unable to use, hence, the apparent deficiency.

The item of $181,505.29 is available for State Highway maintenance.

The item of $900,000.00 of the 1913 appropriation and the item of $192,609.15 of the 1911 appropriation makes a total $1,092,609.15, for State-aid Highway work, but there is due on outstanding contracts the sum of $819,314.90, leaving a balance of $273,294.25, available for State-aid Highway work. In addition to this balance there will be due from counties and townships, when contracts are completed, the sum of $845,774.45.

The item of $373,807.49 can be only used for maintenance of State-aid Highways, being specifically appropriated for that purpose.

The item of $2,571.25, is covered by a contract for work on the National Road.

The item of $248,280.35 belongs to township highways, and cannot be used for State Highway work, either maintenance on construction.

The balance in State Treasury received from Motor-Vehicle license fees for 1913 is $187,771.42. Amount paid to State Treasurer for 1914 license fees, $544,791.00, making a total of $732,562.42. This amount should be available for State Highway work by reason of the specific appropriations made under the Act of the 23d of May, 1913, P. L. 300, and Acts of July 7, 1913, P. L. 672, but which amount the Department is unable to use by reason of an objection made or raised by the Auditor General.

Contracts let by the State Highway Department since June 1, 1913, were for State Highways, 4; for State-aid Highways, 28.

This Department is willing to give to your committee such other information as you may from time to time desire.

JOSEPH W. HUNTER,
First Deputy State Highway Commissioner.

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Harrisburg, Pa., January 30, 1914.

To the Committee of the State Agricultural Board of Pennsylvania.

Gentlemen:—I have the honor to herewith transmit to you a report of the balance in each separate item of the appropriations to the State Highway Department, together with the total of all funds available for use by the Highway Department, as of the close of business January 30, 1914, the total balance being $2,638,915.47 available in all funds for the present use of the Highway Department. Permit me to say that I have no knowledge as to what proportion of this amount is committed upon recent contracts, as the contracts of the Highway Department are not filed with this Department until requisition is drawn for payment thereon. The statement is as follows:

## STATE HIGHWAY DEPARTMENT

| Appropriation. | Act of— | Amount of appropriation. | Balance January 30, 1914. |
|---|---|---|---|
| State highway construction, | 1913 | $1,000,000 00 | $164,068 |
| State highway, salary and expenses, | 1913 | 400,000 00 | 205,786 |
| State highway maintenance, | 1913 | 1,400,000 00 | 161,585 |
| State highway maintenance expenses, | 1913 | 100,000 00 | 88,120 |
| State aid highway, | 1913 | 900,000 00 | 900,000 |
| State aid highway, | 1911 | 1,000,000 00 | 192,600 |
| Traveling expenses, | 1913 | 125,000 00 | 91,152 |
| Experiments and tests, | 1913 | 50,000 00 | 41,330 |
| Contingent fund expenses, | 1913 | 75,000 00 | 59,578 |
| Township road fund, | 1913 | 250,000 00 | 243,280 |
| Automobile expense fund, | 1913 | 160,000 00 | 99,095 |
| Cumberland or National road, | 1911 | 300,000 00 | 2,571 |
| State aid maintenance, | 1913 | 500,000 00 | 373,887 |
| Total amounts, | ........ | $6,260,000 00 | $2,638,915 |

I assure you of my high regard for the State Agricultural Boa and that I will do anything I can to aid the Board in securing true statement of any expenditure of the people's money by an d partment.

Yours very truly,

A. W. POWELL,
Auditor General.

There being no further business, the Board, on motion, adjourne

N. B. CRITCHFIELD,
Secretary.

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